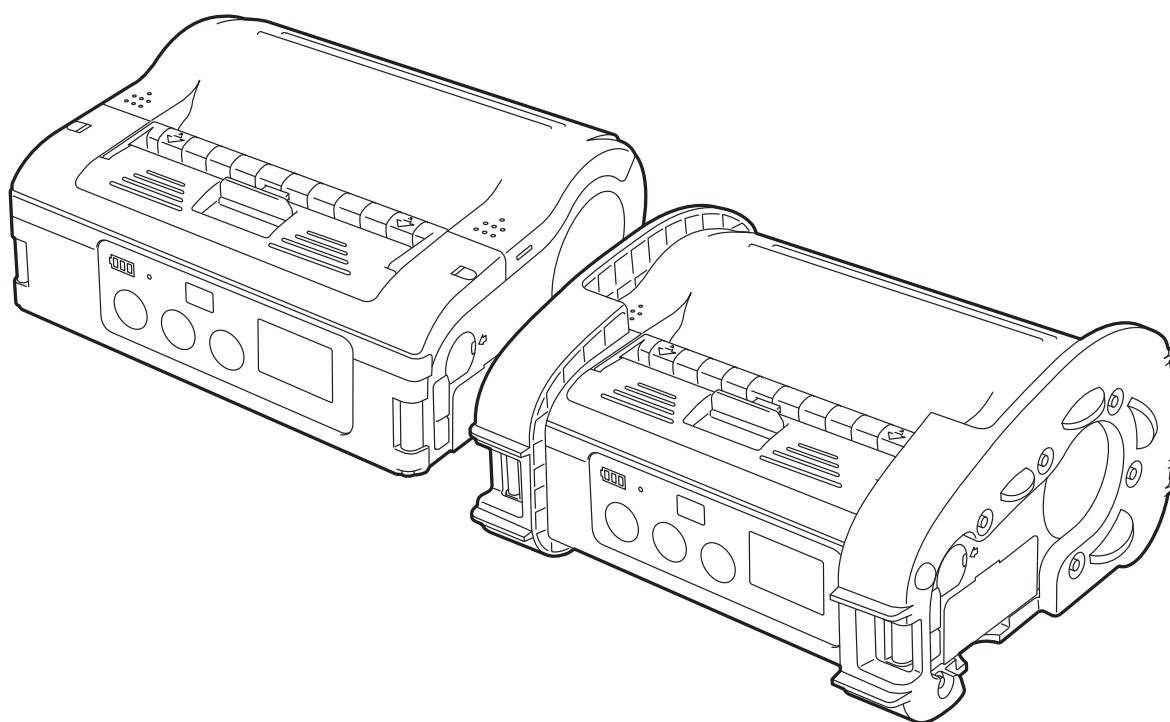




Operator Manual

For printer model:

MB400i / MB410i



Read this Operator Manual before and during usage of the above product.
Keep this document handy for future reference.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Be sure to ask your dealer about our maintenance contracts to ensure a peace of mind during your usage of SATO products.

For SATO office locations worldwide, visit www.satoworldwide.com

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Version: SI-MB40xi-01rC-11-08-OM

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1

TECHNICAL DATA

- **Basic Specifications**

BASIC SPECIFICATIONS

All technical data deemed pertinent has been tabulated below for quick reference. Find the relative section header and then locate the specific type of technical data in the left column.

PHYSICAL CHARACTERISTICS		
	Without rubber boot installed	With rubber boot installed
Width	6.7 Inches (170 mm)	8.0 Inches (202 mm)
Depth	3.0 Inches (76 mm)	3.9 Inches (99 mm)
Height	5.3 Inches (134 mm)	6.5 Inches (165 mm)
Weight	1.65 Pounds (750 g)	2.0 Pounds (910 g)

POWER	
Adapter Voltage (optimal power supply)	Auto switching 100-240 VAC, 50-60 Hz DC output 19V to DC adapter
Battery Supply	Lithium ion, 14.8VDC 1700m Ah
Battery Capacity	Battery continuously prints 4 rolls of thermal labels on a full charge (equivalent to 50 m, print duty of 16%)
Power Saving	Auto power off after no operation for 5 minutes. With Bluetooth or wireless LAN specifications, default is no auto power off. Auto power off time can be changed via the printer operation register command <PG>. For details of the command, refer to the Programming Guide.

ENVIRONMENTAL	
Does not apply to label media Includes battery pack	
Operating Temperature	5° to 122°Fahrenheit (-15° to 50°C) WLAN model 32° to 122° Fahrenheit (0° to 50°C)
Storage Temperature	13° to 140°Fahrenheit (-25° to 60°C)
Storage Humidity	20 to 80% RH, Non-Condensing
Operating Humidity	20 to 80% RH, Non-Condensing

PRINT	
Type	Direct Thermal Only
Speed	4 Inches Per Second (103mm/s) in normal mode 3 Inches Per Second (75 mm/s) in dispenser mode Dual color printing or high resolution modes reduce speed
Resolution	MB400i: 203 Dots Per Inch (8 d/mm) MB410i: 305 Dots Per Inch (12 d/ mm)
Print Module (Dot Size)	0.0049 Inches (0.125 mm)
Maximum Print Width	4.09 Inches (104 mm)
Maximum Print Length	11.69 Inches (297 mm)

MEDIA			
Type	Direct Thermal Roll media		
Wind Direction	Face out		
Roll Diameter	Maximum outer diameter: 2.63 inches (67 mm \pm 0.5 mm)		
Core Diameter	Inner Core diameter: 0.75 inch (19 mm), 1 inch (25 mm)		
Size	[Brackets indicate with liner sheet]		
	Standard	Width	2 to 4.3 Inches (50 to 111 mm) [2.1 to 4.4 Inches (53 to 114 mm)]
		Length	1 to 11.6 Inches (25 to 297 mm) [1.1 to 11.8 Inches (28 to 300 mm)]
	Dispenser	Width	2 to 4.3 Inches (50-111 mm) [2 to 4.4 Inches (53 to 114 mm)]
		Length	1 to 7.1 Inches (25 to 182 mm) [1.1 to 7.2 Inches (28 to 185 mm)]
	Linerless	Width	2 to 4.2 Inches (53 to 107 mm)
		Length	1 to 7.1 Inches (28 to 182 mm)
Thickness	Label: 2.5 Mil to 7.5 Mil (0.064 ~ 0.190 mm) Non-adhesive paper: 2.5 Mil (0.064 mm)		

PROCESSING	
CPU	32 Bit RISC
Flash ROM	4 Megabyte
RAM	2 Megabyte

PRINTING LANGUAGE	
	SATO Barcode Printer Language (SBPL) MB400 Compatible Command

INTERFACES	
RS-232C	Mini DIN (specified)
USB	Mini B Type
Optical Coupling	3-Wire Cooked Mode Infrared communication (compliant with IrDA Standard Ver 1.2)
Bluetooth	Bluetooth Specification
Wireless LAN	Wireless LAN interface (IEEE 802.11b/g) TCP/IP (FTP, LPR, SOCKET)

RADIO FREQUENCY CHARACTERISTICS	
2.4 FH1	
Frequency Band Used	2.4GHz
Modulation System	Frequency Hopped - Spread Spectrum System
Assumed Distance of Interference	10 mm Maximum
Availability of Frequency Change	All area is used, and exclusion of the band for equipment for mobile object identification is impossible
Note 1	Before using a wireless interface with this equipment, make sure that any radio transmission/reception equipment onsite does not share the same frequency range as this product's wireless setup.
Note 2	If any harmful radio interference should occur due to operation of RF equipment that shares the same transmission/reception characteristics, contact your nearest dealer or service center to take appropriate measure to prevent further interference (installing partitions).

SENSING	
Gap (Transmissive)	Fixed
I-Mark (Reflective)	Fixed
Dispenser sensor	Fixed

LABEL PRINTING MODES	
	Continuous Printing

LABEL PRINTING MODES	
	Dispenser Printing
	Journal Printing (no sensing)
	Linerless Printing

SELF-DIAGNOSIS	
	Head Check
	Cover Open
	Paper End
	Battery Check
	Test Print

CHARACTER FONT CAPABILITIES	
FONT TYPES	
Bitmap Fonts	XU, XS, XM, XB, XL, OCR-A, OCR-B, POP character Kanji: 16 x 16, 22 x 22, 24 x 24 Square Gothic (JIS Level 1, Level 2)
TrueType Fonts	CG Times, CG Triumvirate
TEXT CHARACTER MAGNIFICATION	
Bitmap Fonts	1 to 6 Times
Agfa TrueType Fonts	6 to 99 Point
CHARACTER ROTATION	
Rotation	0°, 90°, 180°, 270°

BARCODE CAPABILITIES	
BARCODE SYMBOLOGIES	
Linear Barcode	EAN8/13, UPC-E/UPC-A, NW-7, CODE39, CODE93, CODE128, INTERLEAVED 2 of 5, POSTNET, GS1 Databar (RSS-14)
Two-Dimensional code	PDF417 (ver 2.4) (Micro-PDF supported in SBPL v4.0) QR code (ver 8.1 incl. micro QR) Datamatrix code (ECC200) ver 2.0 MAXI code ver 3.0 Multi-row symbol (UPC-A/E, JAN/EAN, UCC/EAN-128, GS1 Databar (RSS-14) is compatible with CC-A/B/C)
MAGNIFICATION	
	1 to 6 Times

BARCODE CAPABILITIES	
BARCODE SYMBOLOGIES	
ROTATION	
	0°, 90°, 180°, 270°

HARDWARE AND RELATED	
Switches	POWER, PRINT, FEED buttons, DIP switches
Indicators	STATUS LED: One (lights in three colors: green, red and orange). Battery LED: Three Built-in buzzer for audible alerts Backlit 112 x 72 dot LCD screen on WLAN model
Physical Robustness	Without rubber boots installed: Withstands drops from 4.9 feet (1.5 m) height on 6 sides (Breakage and damage to the case is possible). With optional rubber boots installed: Withstands drops from 3.9 feet (1.2 m) height on 26 positions, tested according to US MIL Drop Standard MIL-STD-810F, Procedure IV. (Breakage and damage to the case is possible). Vibration tolerance: withstands bump testing (scrapes on the cover acceptable). Printer is tested for 36,000 vibrations.
Protective Features	Overcharge/discharge protection Print Head overheat protection Non operable in Low Battery state
Water Resistance	Optional shoulder bag with rain-resistant cover (IPX3 JIS C0920-2003), only for printer without rubber boot installed.
Surface Treatment	Antibacterial finishing for external cover and operative parts. Complies with JIS Z 2801

STANDARD PACKAGE, STARTER KIT, AND OPTIONAL ITEMS	
Standard	Battery Pack Quick Guide Shoulder Strap
Standard Package with Starter Kit	Battery Pack AC Adaptor Quick Guide Shoulder Strap

STANDARD PACKAGE, STARTER KIT, AND OPTIONAL ITEMS	
Options	Spare Battery Pack AC Adapter Battery Charger (Single-Socket) Shoulder Bag with Rain-resistant Cover Belt Bag Factory Installed Ruggedized Rubber Boot

REGULATORY COMPLIANCE	
Safety regulation	CSA (CSA22.2 No.60950-1-03), CCC (GB4943-(2001)), SS337:2001, MIC, EK(AC adapter only)
EMC regulation	FCC15B Class B, GB9254-1998, GB17625.1(2003), EN55022, EN55024
Wireless regulation (Wireless LAN/ Bluetooth)	FCC15C, GB4943, GB9254, GB17625.1, R&TTE (EN300 328 V1.4:2003-04), (EN301 489 V1.4.1:2002-08), IDATSSSS
Environment (RoHS)	< 0.1% of Hexavalent chromium compounds, lead and its compounds, mercury and its compounds, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) compounds < 0.01% Cadmium and its compounds

OPTIONAL ACCESSORIES

The MB400i/410i direct thermal printer is supported by many accessories to increase its flexibility.

POWER ITEMS

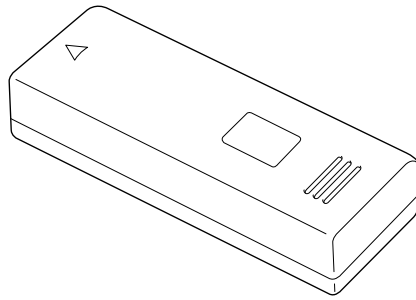


Figure 1-1, Spare battery pack

Spare battery pack—having a spare pack reduces interruption during extended periods of printer operation.

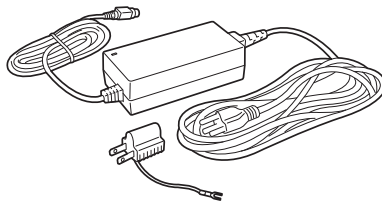


Figure 1-2, AC adapter

AC Adapter—allows the printer to be operated via an AC outlet, and to charge a battery pack loaded inside the printer.

Warning: Use only the specified AC Adapter designed for your printer.

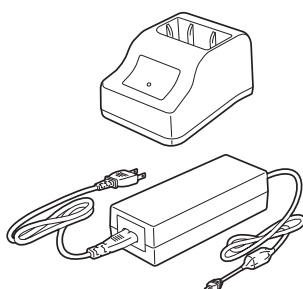


Figure 1-3, Single slot battery charger

Single-slot Battery Charger—use this to charge a battery pack without using the printer connected to an AC outlet.

PORTABILITY ENHANCEMENTS

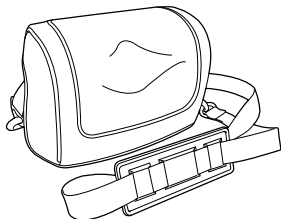


Figure 1-4, Rain-resistant shoulder case

Rain-resistant Shoulder Case — allows users to attach or detach the printer and carry it around easily.

Installation: Pinch the Rain-resistant case with the belt clip of the printer. If the Rain-resistant case is not pinched with the belt clip correctly, the printer may fall off.

Note:

Shoulder case can be used only for the printer without rubber boot installed.

CONNECTIVITY OPTIONS

RS-232C cable—allows connection of the printer to a PC or handy terminal.

FACTORY-INSTALLED OPTIONS

Wireless LAN Interface (with LCD)—allows printing via a WLAN network. The interface comes with an LCD on the front panel to display the status of wireless communication.

Bluetooth Interface—allows printing via a Bluetooth connection.

For more details about the optional accessories, consult the Interfaces section of the Basic Specifications table in this section of this manual, or consult your authorized SATO representative.

2

OVERVIEW

- Overview

OVERVIEW

This manual is laid out consistent with the product discussed and provides all of the information required for operation of the MB400i/MB410i printer.

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different Units, Chapters, and Sections. Each references the page number of their commencement.

The pages of this manual have embedded headers and footers to assist the user in identifying his or her exact position within the manual. The header provides the section number followed by its name. The footer identifies the product on the left, the manual's part number in the center, and the page number to the right side of the page.

Page enumeration is two-part with each separated by a hyphen. The first character set references the Unit and the second identifies the page number. Page numbers begin with the numeral (1) one at the commencement of a new unit and ascends sequentially.

This manual is intended to familiarize you with the basic features and operation of the **MB400i/410i** barcode printer in a short time.

PRODUCT FEATURES

Key features:

- High speed CPU and 103 mm/sec print speed (max)
- Available in 203 dpi and 305 dpi resolutions
- Long battery life
- Durable and rugged design
- Supports media up to 114 mm in width
- Built-in label dispenser (peeler)
- Supports linerless media
- Available in USB, IrDA, RS232C (standard), Bluetooth (optional) and IEEE802.11 b/g (optional) interfaces
- Supports SATO Barcode Printer Language

Please read this manual carefully to make full use of this product. All information herein was correct at the time of this document's release. Revised versions of this document may be created to match updates in firmware and procedures.

BLUETOOTH/WIRELESS COMMUNICATION

COMPLIANCE STATEMENT

This product has been certified for compliance with the relevant radio interference regulations of your country or region. To ensure continued compliance, do not:

- Disassemble or modify this product
- Remove the certificate label (serial number seal) affixed to this product

Use of this product near microwave and/or other wireless LAN equipment, or where static electricity or radio interference is present, may shorten the communication distance, or even disable communication.



"Bluetooth" is a trademark of Bluetooth SIG, Inc., USA., and is used herein under license.






SAFETY PRECAUTIONS

This section outlines the safety precautions needed for safe operation of the printer. Make sure to read the precautions carefully before using the printer.

Symbols used in this manual:

The following symbols or markings are used in this manual and on the printer so that you can properly use the printer, and to prevent any damage to property, harm or injury to yourself and others.

Table 2-1, Symbols

SYMBOL	MEANING
	All safety symbols are enclosed by a circle or triangle. A black circle is for an action you should do. A white circle with a bar across it represents an action you should not do. A triangle indicates that care is needed for that action, to avoid potential hazards.
	This symbol comes with the word Warning or Caution to alert the user to be careful about an action to prevent (possible) damage or injury.
	This symbol alerts the user about the (possible) risk of electrical shock if care is not observed when performing a certain action.
	This symbol indicates that the user should remove the AC cord by pulling the plug and not the cord.
	This symbol indicates that the user should NOT attempt to disassemble or service the product.

USAGE SAFETY

- Do not place the printer in a hot or cold place

The operation temperature range is -15°C to 50°C (for wireless LAN: 0 to 50°C) where humidity is less than 80% and does not cause condensation. Do not place the printer in an area with high humidity or at a temperature outside the specified range.

- Do not drop or apply undue shock to the printer

The printer is generally resistant to vibration possibly caused during normal transportation. However, do not apply extreme vibration or shock by dropping the printer.

- Do not disassemble or modify the printer

The printer has high-precision components inside requiring fine adjustment.

- Connect the correct cables to the input terminals

Cables of the correct specifications are required for connection to the external equipment through the external input terminals. Contact your nearest dealer or service center if necessary.

- Use the recommended accessories

Using optional equipment other than the specified equipment may cause a malfunction. Always use the equipment specified in this guide.

- Use the correct media

Use the specified media. Otherwise, faulty printing or printer damage may occur.

USAGE WARNINGS

Table 2-2, Warnings

















 Liquids	Do not place any container with water or chemicals, such as flower vase or cup, as well as small metallic objects, near the printer. If any of these should drop into the printer, immediately turn off the power and contact your nearest dealer or service center. Continued use creates a danger of fire or electric shock.
--	--

Table 2-2, Warnings

 <p>Foreign Matter</p>	<p>Do not drop or insert metallic or flammable objects into the openings on the printer (such as outlets for cables). If any of these should fall into the printer, immediately turn off the power and contact your nearest dealer or service center. Continued use creates a danger of fire or electric shock.</p>
 <p>Physical Shock</p>	<p>Should the printer ever be dropped or otherwise become damaged, immediately turn off the power and contact your nearest dealer or service center. Continued use creates a danger of fire or electric shock.</p>
 <p>Abnormal Signs</p>	<p>Continued use of the printer while it is emitting smoke or strange odors creates the danger of fire or electric shock. Immediately turn off the power and contact your nearest dealer or service center. Do not try to service the printer by yourself.</p>
 <p>Disassembly</p>	<p>Never try to take the unit apart or modify it in any way. Doing so creates the danger of fire or electric shock. Contact your nearest dealer or service center for checking, adjustment, or repair.</p>
 <p>Battery Pack</p>	<ul style="list-style-type: none"> • Never try to take apart the battery pack or modify it in any way such as with a solder iron. • Never expose the battery to fire, or take any actions that may lead to shorting. • When charging the battery pack, make sure to use the printer or the specified battery charger.
 <p>AC Adapter / Battery Charger (Option)</p>	<ul style="list-style-type: none"> • Use only the specified voltage. Using a different voltage may create the danger of fire or electric shock. • Use only the specified AC adapter. Using a different adapter unit may create the danger of fire or electric shock. • Never use the battery charger with any other battery pack except for the specified unit. Doing so can rupture the battery, cause leakage, or cause fire or an electric shock. • Never cut, damage or modify the power cord. Also, never place heavy objects on the power cord or heat or pull the power cord. Doing so may damage the cord and create the danger of fire or electric shocks. • Should the power cord ever become seriously damaged (internal wiring exposed or shorted), contact your nearest dealer or service center for repair. Continued use of such a cord creates the danger of fire or electric shock. • Never modify, excessively bend, twist, or pull the power cord. Doing so creates the danger of fire or electric shocks.

USAGE PRECAUTIONS**Table 2-3, Usage Precautions**

 Location	Do not locate the printer in areas with high humidity or dew. If dew forms inside the printer, immediately turn it off, and do not use it until the dew has dried up. Otherwise, continued use creates the danger of electric shocks or printer damage.
  Power	<ul style="list-style-type: none"> Do not use wet hands to operate the power switch, replace the battery pack or unplug the AC adapter or battery charger. Doing so creates the danger of electric shocks. The AC adapter set provided for this printer is specific to this printer. Do not use it for other electrical equipment.
  Print Head	<ul style="list-style-type: none"> The print head gets very hot after printing. To avoid burns, take care when replacing the label or cleaning the printer just after printing. Touching the end of the print head with bare hands may cause injury. Take care when replacing the label or cleaning the printer. Do not try to replace the print head by yourself. Doing so creates the danger of injury, burns, or electric shocks.
  Battery Pack	<ul style="list-style-type: none"> When replacing the Battery Pack use only the specified design. Make sure to install the pack in the correct orientation. Incorrectly replacing the battery creates the danger of injury or damage to surrounding areas, if an explosion is caused. To dispose of a small rechargeable battery (Lithium ion battery), seal the metal contacts with tape, and ask our sales representative or service center for the measures to be taken to recycle the reusable materials. Do not place the battery pack together with other batteries such as dry batteries.
 Storage	If you have no plan to use the printer for a long time, remove the battery pack from the printer and/or unplug the AC adapter from the wall outlet before storing the printer (if you were using the AC adapter as the power source).
 Maintenance	For safe maintenance or cleaning of the printer, make sure to remove the battery pack and the AC adapter from the printer.

3

SETUP

- **Setup**

SETUP

UNPACKING THE PRINTER

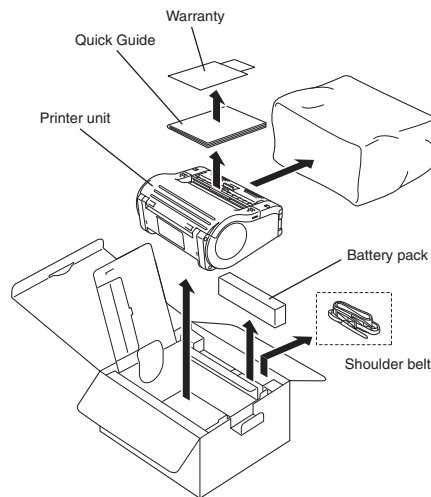


Figure 3-1, Unpacking the printer

NOTES:

If any component shown here is missing, contact your nearest dealer or service center.

An external battery charger is available separately.

PART NAMES

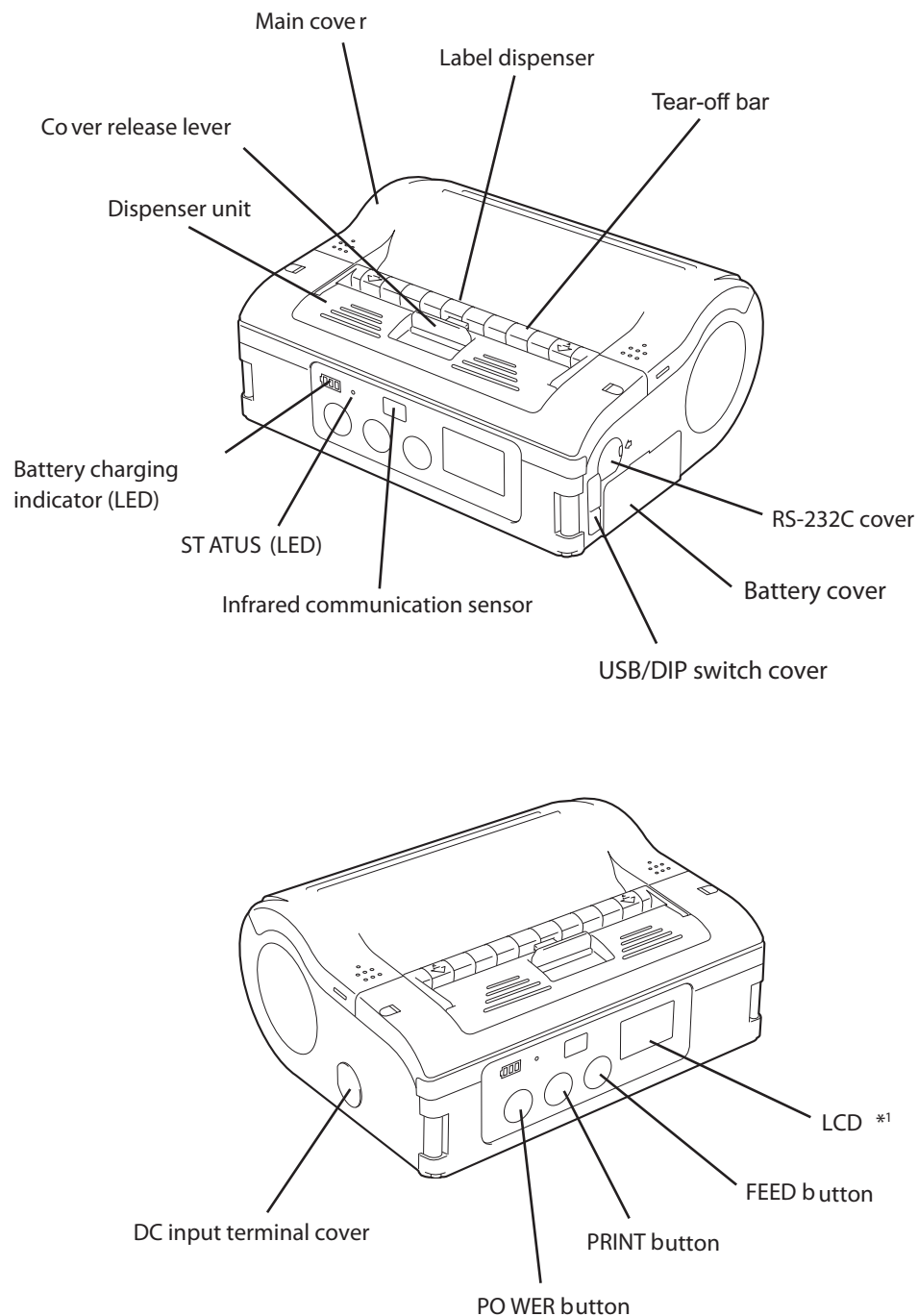


Figure 3-2, Parts Identification

*1 Only the WLAN model comes with an LCD screen.

NOTES:

MB400i/MB410i series have an option to install a set of rubber boots to the exterior at the factory. The appearance is similar, except on two sides. This document shows the picture of the printer without the rubber boot installed.

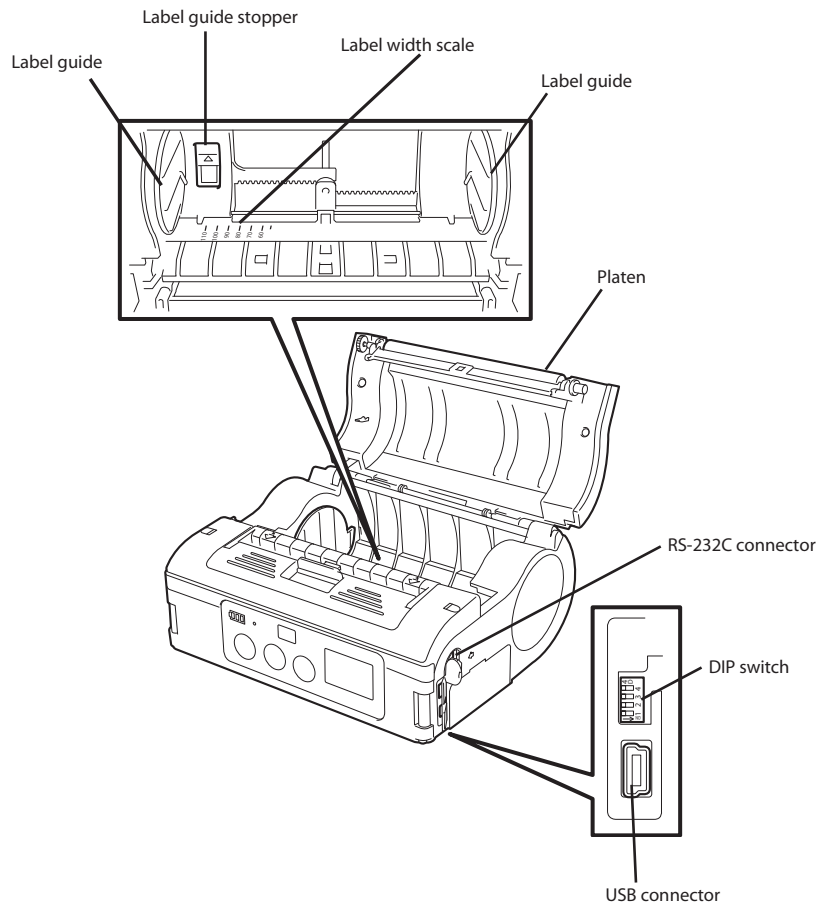


Figure 3-3, Specific Parts Identification

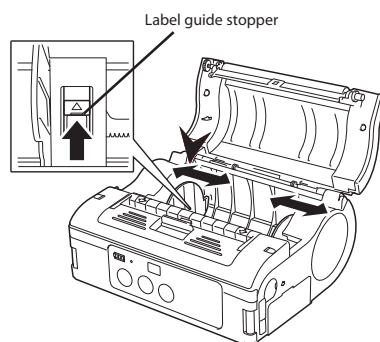


Figure 3-4, Label Guide Stopper

FUNCTIONS OF VARIOUS PARTS

RS-232C Interface	Allows connection to a computer or handy terminal
Label guide	Set to meet the size of the label used
RS-232C cover	Protects the RS-232C connector from dust and damage
Label guide stopper	Allows adjustment of the label guide to fit the width of an installed label roll
Cover	Opens up to allow the installation of labels
Cover Open/Close lever	Enables the user to releases the cover, or to lock the cover shut
Label output area	This is the area where the printed label is output
Tear-off bar	Allows an easy tear position for perforated backing between labels
Label Width Markings	Indicates the width of label installed or in use.
IrDA filter	Contains the IrDA (infrared) sensor and emitter
DC input jack	Allows for connection to optional AC adapter, which supplies direct current to the printer and charges battery.
DIP Switch	Sets the operation mode of the printer. <i>(See Enabling and Disabling Special Functions in the Operating Modes section.)</i>
Cover for DC input jack	Protects the DC input terminal and DIP switch from dust and damage
Dispenser unit	Moved to select Dispense mode
FEED button	Press to feed label
POWER button	Allows the user to turn ON/OFF the printer
PRINT button	Takes the printer Online or Offline
Battery cover	Cover for special battery pack
Status LED	Indicates the status of the printer. <i>(See Other Printer Modes in Section 4: Operation and Configuration, and the tables in the Troubleshooting Section of this manual.)</i>
Battery life indicator (LED)	Three LEDs indicate the amount of battery power remaining for the printer. (See Table: Hardware and Related, in the row: Indicators in Section 1 of this manual, Technical Data.)

CHARGING THE BATTERY PACK WITH A CHARGER

If your printer comes with the optional battery charger, you can use it to charge the supplied battery pack. Follow the steps below:

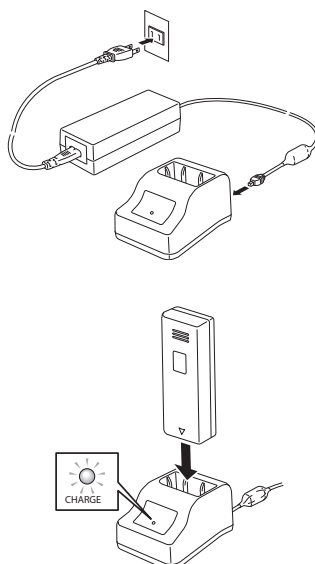


Figure 3-5, Charging the Battery Pack with a Charger

1. Connect the power cord to the charger unit, then plug it to the wall outlet and turn on the power.
2. Insert the battery pack into the slot, with the terminal pointing downward. When charging begins, the CHARGE lamp (red) lights. When charging is completed, the CHARGE lamp lights green (fully charged).
3. Remove the battery pack when charging is completed.

NOTES:

- If the CHARGE lamp does not light at the start of charging, make sure the battery pack is firmly mounted into the charger. Poor mounting of the battery pack may result in faulty charging.
- When the fully charged battery pack is placed into the battery charger, the CHARGE lamp first lights red, then lights green.
- When charging a battery pack that has not been used for a long time, the CHARGE lamp may blink for a while. This does not indicate an error. You can continue charging.
- The battery pack can be recharged about 300 times (when used at normal temperatures). If the battery pack is fully charged but runs out quickly, replace it with a new battery. The battery may still be used, but the battery life may degrade over time.

CHARGING TIME

It takes about 1.5 hours for a fully discharged battery pack to return to a fully charged state.

CHARGING THE BATTERY PACK WITH THE PRINTER

If you purchased the optional AC adapter or your printer comes with the supplied AC adapter, the printer can be used to charge the supplied battery pack. Follow the steps below:

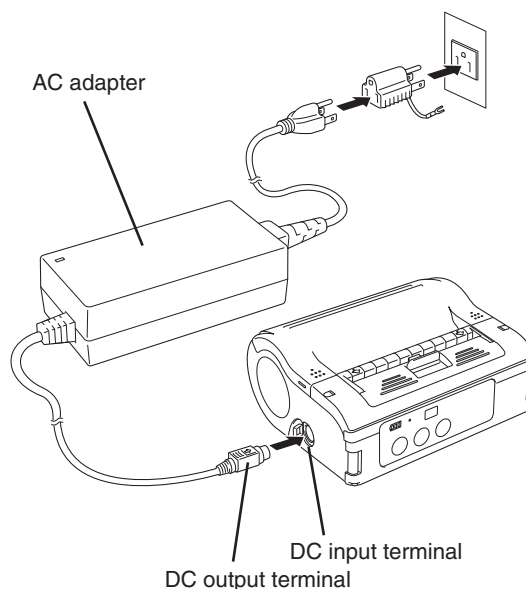


Figure 3-6, Charging the Battery Pack with the Printer

1. Remove the cover of the printer's DC input jack and connect the AC adapter's DC output terminal to it.
2. Connect the AC adapter to the wall outlet and turn on the power. The POWER lamp on the adapter lights green. Charging starts and the battery indicator on the printer lights red. When the battery pack is fully charged, the battery indicator goes off.

In the case of the MB400i/410i Wireless LAN interface model, the Battery Strength segments (See section, Operation and Configuration) on the LCD screen will appear when charging starts, and go off when charging is complete.

NOTE:

- The AC adapter set used for this printer is specific to this printer. Do not use it for other electric equipment.

CHARGING TIME

With the AC adapter, it takes about 5 hours for the battery pack to reach full charge from a fully discharged state.

USING THE BATTERY PACK

Turn the printer off before removing or replacing the battery.

INSERTION

1. Unlatch the battery compartment cover.

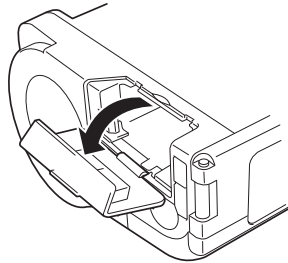


Figure 3-7, Unlatching Battery Compartment Cover

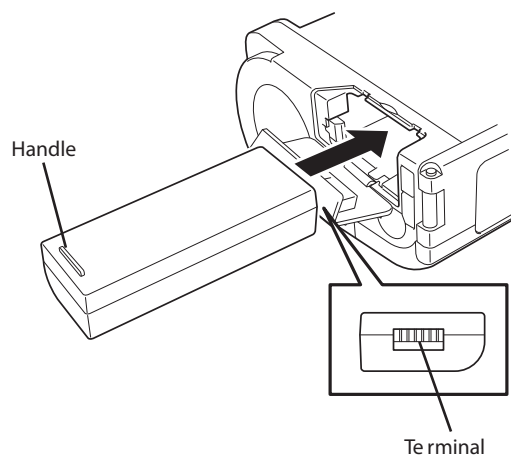
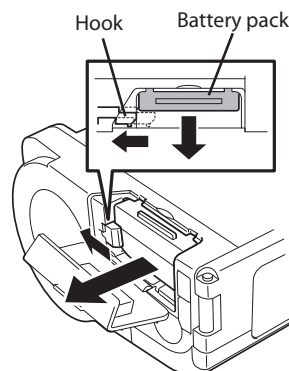


Figure 3-8, Inserting Battery Pack

2. Align the battery pack so that its metal terminals are facing forward. Insert the battery pack while pressing and holding the gray hook. (See hook in Figure 3-9.) Close the battery cover.

REMOVAL**Figure 3-9, Removing the Battery Pack****NOTE:**

Remove the battery pack only when the STATUS LED is OFF. When the printer is turned off, the STATUS LED goes off. Do not remove the battery while the STATUS LED is on. Otherwise, the information stored in the printer may not be updated.

1. Unlatch the gray hook inside the battery compartment, to release the battery. The battery pack is released upwards.
2. To pull out the battery pack, make use of the tab that is attached to the top part of the battery pack.

USING THE SHOULDER BELT

This belt allows you to carry the printer on your shoulder.

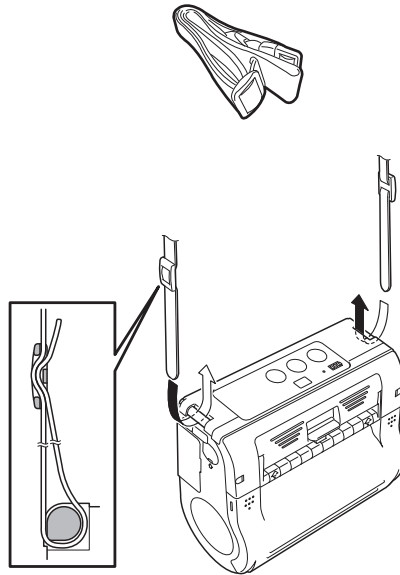


Figure 3-10, Preparing the Shoulder Belt

INSERTION

1. Thread the shoulder belt through the belt holes on the printer, from the outside to the inside.
2. Thread the end of the shoulder belt through the buckle, and adjust the length.

** If the belt is not routed correctly, the printer may drop off.*

USING THE OPTIONAL AC ADAPTER FOR POWER

If you purchased the optional AC adapter or your printer comes with the supplied AC adapter, the printer can be operated on AC power instead of the supplied battery pack.

Follow the steps below:

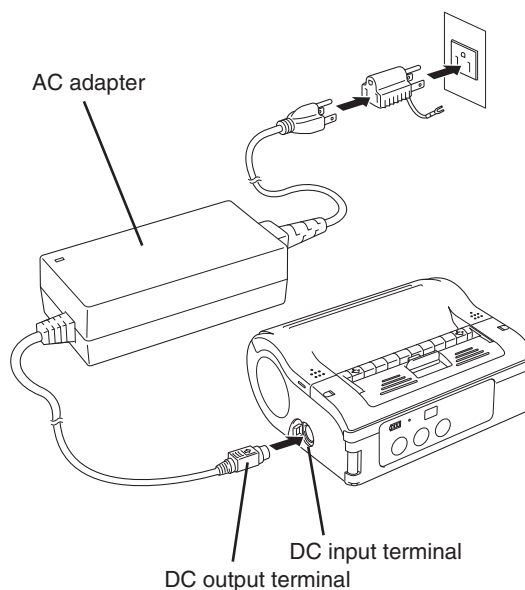


Figure 3-11, Connecting the AC Adapter for Power

1. Remove the cover of the printer's DC input jack and connect the AC adapter's DC output terminal to it.
2. Connect the AC adapter to the wall outlet and turn on the power. The POWER lamp turns green.

NOTES:

- Be sure to turn the printer power off when removing the DC output terminal of AC adapter or disconnecting the power source. Otherwise, the information stored in the printer may not be updated.
- A battery pack is unnecessary when an AC adapter is used. If a battery pack and an AC adapter are being used at the same time, the printer will attempt to charge the battery pack (if it is not already fully charged).
- The AC adapter set used for this printer is specific to this printer. Do not use it for other electric equipment.

LOADING THE LABEL ROLL (CONTINUOUS MODE)

The method of installing label media varies with your choice of the two possible print modes—continuous or dispense mode.

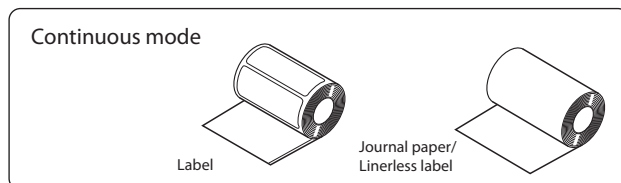


Figure 3-12, Continuous Mode

Dispenser unit

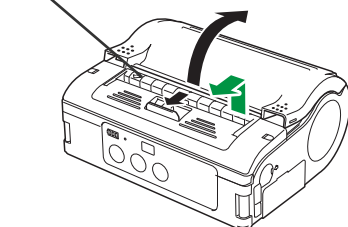


Figure 3-13, Sliding Dispenser Unit Down

1. Make sure you can see the red platen roller. If not, slide the dispenser unit down, by lifting its top edge (Tear-off bar) upwards at the two arrow marks. Now push the dark gray Cover Open/Close lever downwards to release the cover.

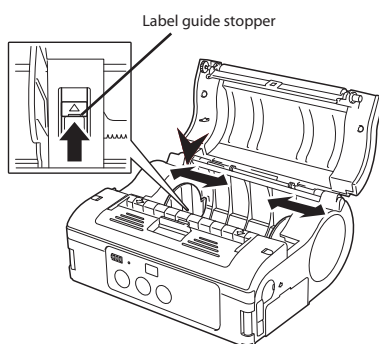


Figure 3-14, Adjusting Label Guide Stopper

2. While pressing the label guide stopper, slide the label guide to the width of the label roll being loaded. (Note the measurement on the inside of printer.)

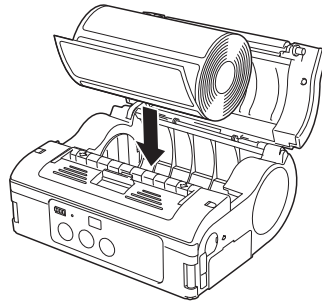


Figure 3-15, Placing Label Roll into Printer

3. Place the label roll into the printer. Make sure the label roll is placed with the first label feeding from the bottom of the roll and not from the top (see picture). Thermal sensitive side or exposed label should be facing the tear-off bar or print head.

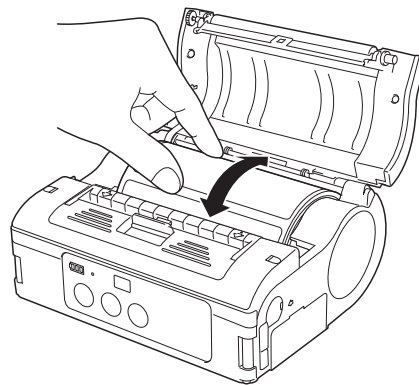


Figure 3-16, Ensuring the Label Roll rotates

4. Turn the label roll lightly by hand and confirm that it rotates smoothly. Otherwise, paper may not be fed correctly during operation. Close the dial cover.

NOTE

When replacing a label roll of the same width as that used previously, adjustment of the label guide is not necessary.

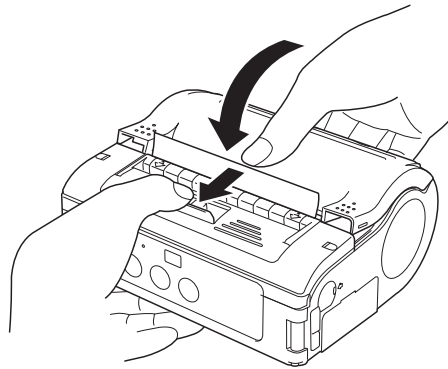


Figure 3-17, Closing the Cover

5. Close the cover after confirming that the leading edge of the label is outside the printer.

This completes the label installation for continuous mode operation.

LOADING THE LABEL ROLL (DISPENSE MODE)

For operating in the Dispense mode, the following label loading procedures apply.

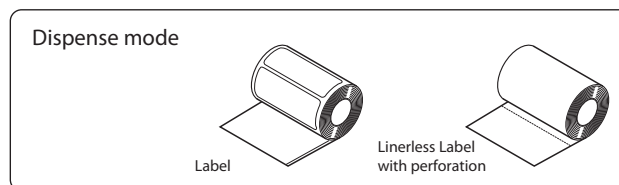


Figure 3-18, Dispense Mode

Dispenser unit

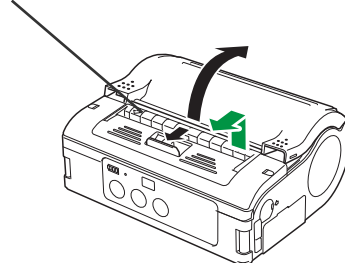
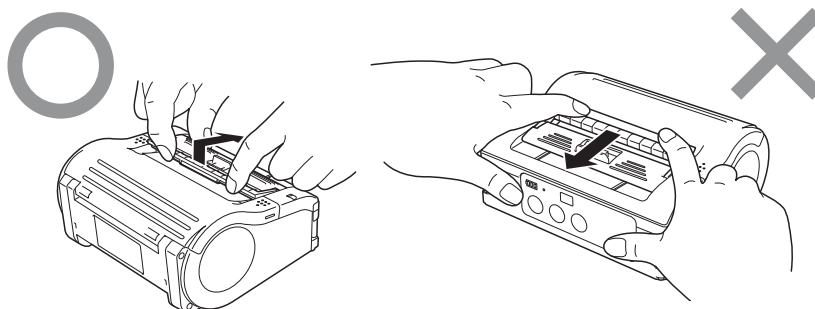


Figure 3-19, Adjusting Printer Until You Can See Red Platen Roller



**Figure 3-20, Moving Tear-off Bar Toward You.
On Left is Correct Way. On Right is Wrong Way.**

1. Make sure you can see the red platen roller. If not, with the unit's operations panel facing you, grip the Tear-off bar, lift it up and move it toward you. This slides the dispenser unit down toward you. Now, push the dark gray Cover Open/Close lever downward to release the cover.

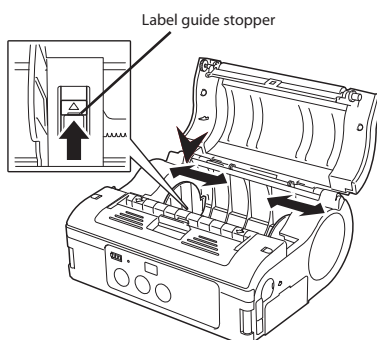


Figure 3-21, Adjusting the Label Guide

2. While pressing the label guide stopper, slide the label guide to the width of the label roll being loaded. Note the measurement.

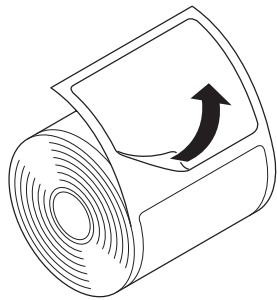


Figure 3-22, Peeling the First Label on Top of Roll

3. Peel the first label on the top of the label. *This step is unnecessary when a linerless label is used.*

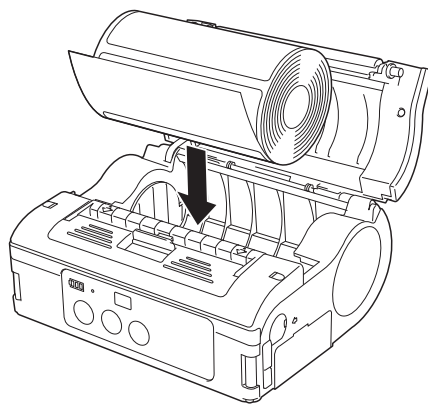


Figure 3-23, Inserting Label Roll

4. Insert the label roll into the printer. Make sure the first label emerges from the bottom (not top) of the roll.

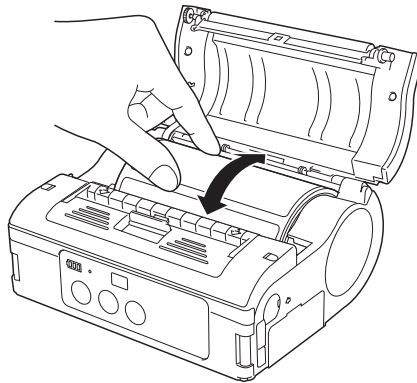


Figure 3-24, Ensuring Label Roll Rotates

5. Adjust the label guides by hand to ensure that the label roll can be rotated smoothly. Otherwise the paper may not be fed correctly during operation.

When replacing a label roll of the same width as that used previously, adjustment of the label guide is not necessary.

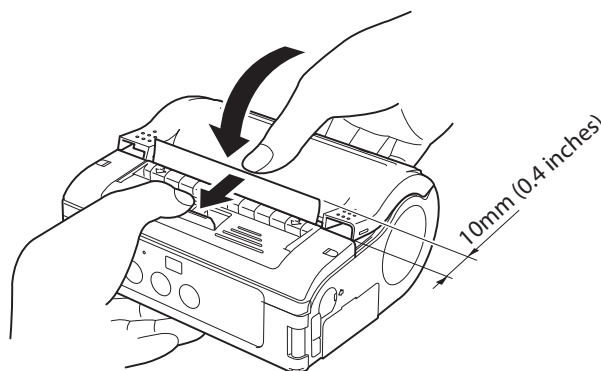


Figure 3-25, Closing the Printer Cover

6. Close the cover after confirming that the leading edge of the liner is outside the printer by at least 10mm (0.4 inches).
7. For linerless label with perforation, pull the label upward to tear along the perforated line. Ensure that the tear-off edge is just at the beginning of the red platen roller. Otherwise, reload the label.

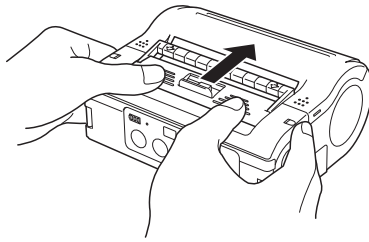


Figure 3-26, Sliding Tear-off Bar

8. With the printer's operations panel facing you, hold it with two hands, and put your thumbs on the two sets of parallel bars molded in the Dispenser unit on either side of the dark gray Cover Release Lever. Push away from you toward rear of unit, using your thumbs, until it stops sliding.

If the linerless label clogs at the dispenser, clear the label and re-load the label.

This completes the label installation for Dispense mode operation. To resume operation in Continuous mode, with the printer operations panel facing you, lift the Tear-off bar of the dispenser unit (where two arrow marks are imprinted) to move it downward toward you. In Continuous mode, the red platen roller will be visible.

4

OPERATION AND CONFIGURATION

- Operation and Configuration

OPERATION AND CONFIGURATION

TURNING THE PRINTER ON OR OFF

After setting up the printer and label roll in Section 3, you can now operate the printer properly.

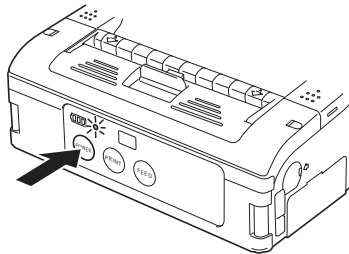


Figure 4-1, Location of Power Button

TURNING THE PRINTER ON

Press and hold the POWER button. When the STATUS LED lights green, release the button

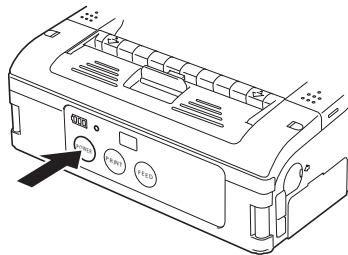


Figure 4-2, Pressing Power Button to Turn Off

TURNING THE PRINTER OFF

Press and hold the POWER button again. When the STATUS LED goes off, release the button.

SETTING THE DIP SWITCHES

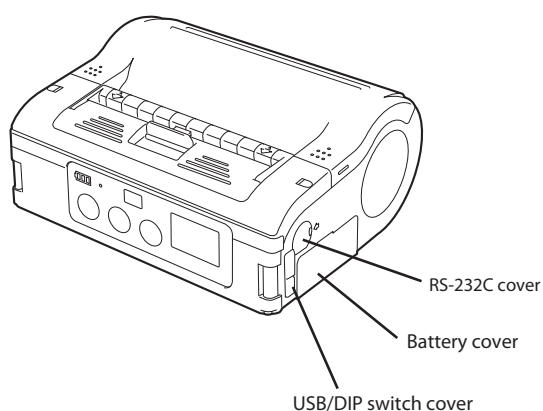


Figure 4-3, Location of DIP Switch Cover

1. See USB/DIP switch cover in Figure 4-3. Orient the printer with the USB/DIP switch cover facing you.

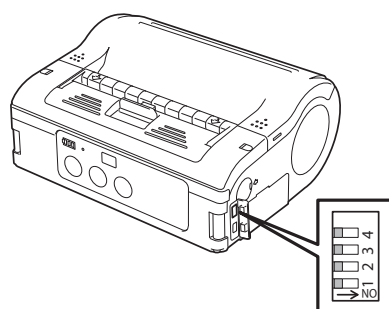


Figure 4-4, Printer with DIP Switch Cover Open

2. You can pry open the USB/DIP switch cover so that the DIP switches are accessible to you. Use a small screwdriver to pry outward the small black vinyl cover labeled DSW on corner of unit as it is shown in Figure 4-4.
3. Look straight downward into the DIP switch compartment or panel in order to see the white DIP switches. Next to switch number 1 is a directional arrow showing the On setting direction. Off is in the opposite direction. Figure 4-4 also shows the On arrow.
4. In order to determine how to set the DIP switches, use the table in the Enabling and Disabling Special Functions section of the Operating Modes chapter in this manual.
5. To adjust a DIP switch, push the white switch with either the end of a paper clip or a very small screwdriver.

PERFORMING A TEST PRINT

Users can perform test prints to evaluate the print quality and also diagnose problems.

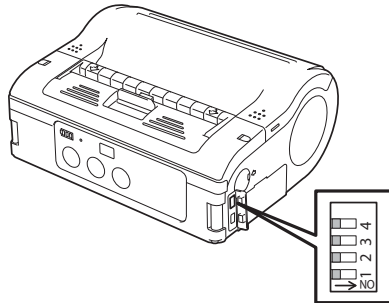


Figure 4-5, Printer with DIP Switch Cover Open

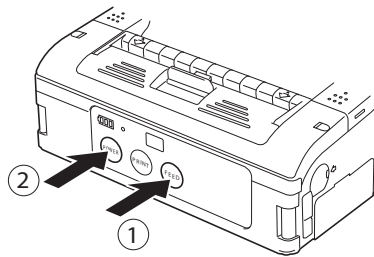


Figure 4-6, Pressing POWER and FEED buttons

1. Open the small black vinyl cover labeled DSW - USB on side panel of unit. Figure 4-5 shows the cover for the DIP switches and USB port in the open position. The source of the enlarged view of the switches are the parts under the small cover.
2. Set the printer DIP switch for User Test Print mode in the table in the Enabling and Disabling Special Functions section of the Operating Modes chapter in this manual.

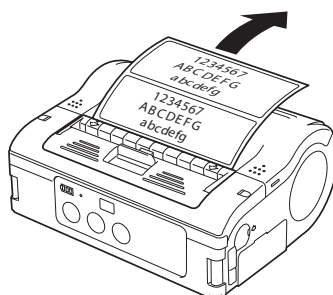


Figure 4-7, Printing a Test Print

3. Press the POWER button while pressing and holding down the FEED button. The printer enters the test mode. Press the FEED button again to do a test print. Press FEED button to stop test print.

Verify the following using the output of the test printing.

- All printed characters are solid black, without any chipped areas.
- Overall print quality is readable and sharp.

A low battery condition may affect the print quality. Make sure the printer is running on AC or on a full battery during a test print.

NOTE:

If any fault is detected, contact your SATO dealer or service center. Before asking for a repair, please read the Troubleshooting section of this manual.

PRINTING VIA THE RS-232C INTERFACE

Use the following procedure to print by connecting to a computer or a handy terminal through an RS-232C cable option.

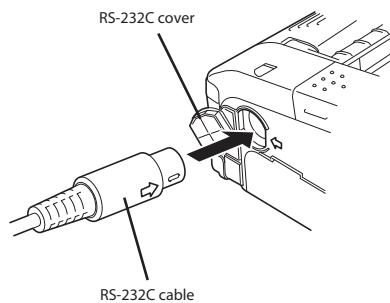


Figure 4-8, Inserting RS-232C Cable

1. Check that all DIP switches are off.
2. Locate the RS-232C interface port cover and lift it up to expose the port.
3. Plug one end of the RS-232C cable firmly into the port. Make sure that the arrow mark on the connector of the RS-232C cable matches with the arrow mark by the side of the printer's port.
4. Plug the other end of the RS-232C cable into the corresponding RS-232C connector of the computer or handy terminal. For information on the host device RS-232C connector, refer to the relevant instruction manual.

NOTE:

Default RS-232 settings are 19,200 BAUD, no parity, 8 data bits, and one stop bit. To change them, you must refer to the programming manual, or use the MB400i/MB410i tools utility program and Windows print driver.

BASIC SPECIFICATIONS FOR RS-232C INTERFACE

The maximum receive buffer capacity is 128KB. When near full has occurred, 24KB remain. When near full is released, 52KB remain.

When setting flow control to hardware, the flow control function will be activated by High RS signal from the occurrence to the release of near full. In this case, buffer overflow can be avoided.

The printer side connector type is Model number TCS7578-43-201, manufactured by Hosiden Corporation.

INPUT AND OUTPUT SIGNALS

PIN NUMBER	SIGNAL	I/O	DESCRIPTION
1	SD	Output	Data to the host computer from the printer
5	CS	Input	Transmission request signal from the host (Flow control)
3	-	-	
6	RD	Input	Data to the printer from the host computer
4	-	-	
2	RS	Output	Transmission request signal from the printer (Flow control)
7	SG	-	Signal ground

PRINTING VIA THE IRDA INTERFACE

Use the following procedure to print through the IrDA interface.

1. Ensure that the DIP switch 1 is set to ON and DIP switch 2 to 4 are OFF.

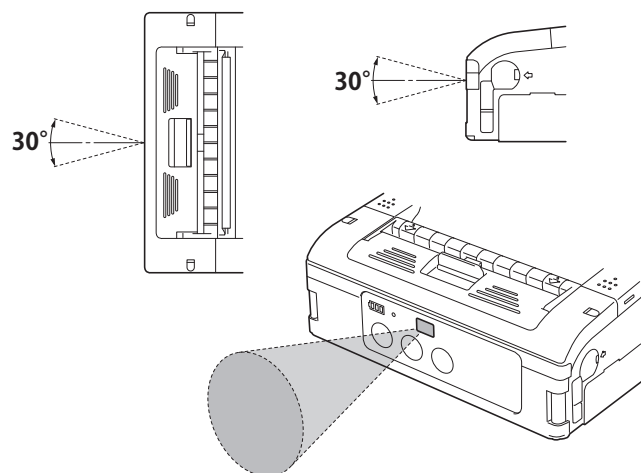


Figure 4-9, Positioning the Printer

2. Place the printer 7.9 inches (20 cm) away from the IrDA port of the computer or handy terminal. Adjust the printer position so that the center of its IrDA filter projects a 30° conical area, which contains the IrDA transceiver of the computer or handy terminal.

NOTES:

- IrDA utilizes 3-wire cooked method of transporting data.
- IrDA communication is limited to a 5.9 to 7.9 inches (15 to 20 cm) range.
- The usable range may vary depending on the usage environment, or the capabilities of other IrDA devices. Communication is compromised by direct sunlight or ambient light. In such a case, block the strong light from entering the IrDA filter, or reduce the distance between the two IrDA ports.

PRINTING VIA THE USB INTERFACE

To print with an optional USB cable (mini B type) connected to a PC or a handheld terminal, perform the following operations.

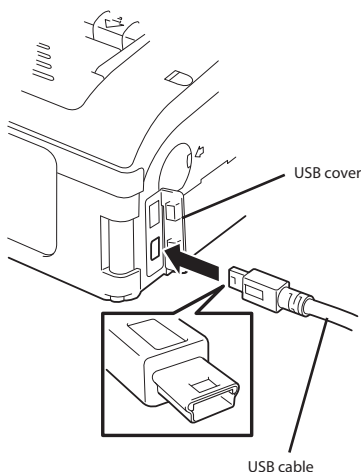


Figure 4-10, Inserting USB cable

1. Pry open the USB/DIP switch cover and set the DIP switch 1 and 2 to ON position and set the DIP switch 3 and 4 to OFF position.
2. Insert the USB cable into the connector. Make sure the shape and orientation of the plug is correctly aligned.
3. Connect the other end of the USB cable to the connector on the PC or the handheld terminal. For the connector on the PC or the handheld terminal, see the manuals provided with that equipment.

USB 1.1 SPECIFICATIONS

The Universal Serial Bus (USB) interface is a factory installed option that must be specified at the time of order. It required a driver (shipped with each printer that has the interface installed) that must be loaded on your PC and the PC must be configured to support USB peripherals using Microsoft Windows. Details for loading the USB driver are contained in the USB Interface manual that is shipped with each printer with a USB Optional interface installed. Up to 127 devices may be connected to a USB port.

USB 1.1 SPECIFICATIONS	
Transfer Rate	11Mbps per second
Communication Control	STATUS3 return
Code type	ASCII character code, JIS Kanji code
Connector	Mini B type
Max. Receive buffer	<p>128 KB</p> <p>When implementing the flow control into the hardware, the flow control will activate when "buffer full" is detected and deactivate as soon as "buffer full" is released. During that span the flow control manages the information flow and prevents a buffer overflow.</p>

PRINTING VIA THE OPTIONAL WIRELESS LAN INTERFACE

To print using the Wireless LAN MB400i/410i, you need to have a properly configured wireless LAN set up. The next step is to configure the MB400i/410i to share the same network settings in order to establish communication.

1. Check the DIP Switches:

The printer's DIP switches are factory set for WLAN operation. Check that DIP switch 1 is OFF and DIP switch 2 is ON. In case you need to reset other switches, refer to the DIP-Switch settings in the table, Enabling and Disabling Special Functions, in the chapter, **Operating Modes**.

2. Set up a connection to the Wireless Network

The next step is to ensure that your printer is configured with the proper **IP address, subnet mask, gateway, SSID, Channel, WLAN mode** and **security settings**. Refer to your MIS personnel for details of your existing wireless network settings. Your **SATO-certified System Integrator/dealer** can help to set up the connection to your corporate wireless network. To configure the printer yourself, consult them for the necessary MB400i/MB410i configuration software tools and for the Windows print driver.

NOTE:

When printing with the WLAN interface, the usable range between the printer and the host may vary depending on the usage environment and the capabilities of the connected devices.

PRINTING VIA THE OPTIONAL BLUETOOTH INTERFACE

To print using the Bluetooth-enabled version of MB400i/410i, you need to have a Bluetooth-enabled computing device. Then follow the following two steps.

1. Check the DIP Switches:

The printer's DIP switches are factory set for Bluetooth operation. Check that DIP switch 1 is OFF and DIP switch 2 is ON. This is the main setting for Bluetooth operation. In case you need to reset other switches, refer to the full DIP switch settings in the table, Enabling and Disabling Special Functions in the Operating Modes chapter.

2. Synchronize Bluetooth settings

After setting the DIP-switches, the next step is to ensure that both Bluetooth devices are configured to operate with the same **PIN code** and **Authentication mode** settings. Refer to the instruction manual of the computing device for details on how to set these parameters. Enter the default PIN code of 16 zeros.

For the MB400i/410i, these parameters can be set by a **SATO-certified System Integrator/dealer**, or by using Bluetooth communication software available from your SATO dealer or service center. To configure the printer yourself, you may use the MB400i/MB410i configuration tool and the SATO Windows print driver.

NOTE:

When printing with the Bluetooth interface, the usable range between the printer and the host may vary depending on the usage environment and the capabilities of the connected devices.

OPTIONAL LCD SCREEN

The Wireless LAN version of the printer is factory-fitted with a Liquid Crystal Display (LCD). The screen can display the following information:

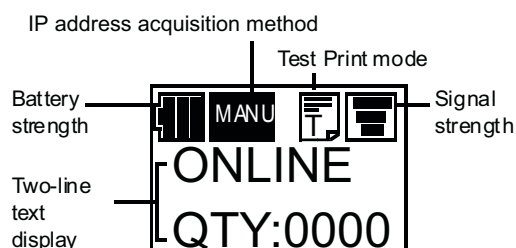


Figure 4-11, Wireless LAN Version Liquid Crystal Display (LCD) elements

- **Battery strength:** Three-segment indicator. When all segments are lit, voltage level is greater than 15.0 V. Two segments indicate a level of between 14.4 V and 14.9 V. One segment indicates a level of between 13.6 V and 14.3 V. When all segments are off (voltage level below 13.5 V), printing is not possible.
- **Signal strength:** Three-segment indicator to indicate Minimum, Medium and Maximum signal quality. An X indicates no reception.
- **Test Print indicator:** Appears in Test Print mode.
- **Two-line text display:** Displays the following:
 1. **Various status messages:** Firmware version, Online mode, Offline mode, labels remaining in print queue, Test Print status, Default Setting, Complete, Factory Clear, Press Feed Key, Press Print Key, Hex Dump Mode, Set up Display, Adjust LCD, Exit, Contrast, Back Light On. (For more information, see Indicators in the Hardware and Related table in the Basic Specifications section, Status LED in the Functions of Various Parts table in the Setup section, and Enabling and Disabling Special Functions in the Operating Modes section.)
 2. **Warning messages:** Cover Open, Paper End, Sensor Error, Buffer Near Full, Head Protect, Head Error, Module Error. (For more information, see Troubleshooting section.)
 3. **WLAN information:** Messages such as Adhoc mode, Infrastructure mode, IP address, subnet mask, default gateway, Socket Port Number.

ADJUSTING DISPLAY CONTRAST

To adjust the contrast of the LCD, go into Maintenance mode. Use the FEED button to select options, and the PRINT button to confirm a selection.

Now select the “Adjust LCD” option and then the Contrast “option.” Values cycle between 30 and 63.

PRINTER CONFIGURATION

The keys of the operator panel and DIP switches are used either singularly or in conjunction to perform configuration activities. The DIP switch complex is accessible from the right housing cover.

FACTORY DEFAULTS			
DSW1	DSW2	DSW3	DSW4
OFF	OFF	OFF	OFF

ONLINE COMMANDS							
DESCRIPTION	DIP SWITCHES				COVER	PRINT KEY	FEED KEY
Online Command (SBPL)	ON	ON	ON	ON	Opened	OFF	ON
Online Command (MB400 compatibility)	ON	ON	ON	ON	Opened	ON	OFF

RS232C QUICK REFERENCE TABLE							
DESCRIPTION	DIP SWITCHES				COVER	PRINT KEY	FEED KEY
Normal Mode	OFF	OFF	OFF	OFF	Closed	OFF	OFF
User Test Print					Closed	OFF	ON
Default Setting					Opened	ON	OFF
Hex Dump	OFF	OFF	ON	ON	Closed	OFF	OFF
Font Download	OFF	OFF	OFF	ON	Closed	OFF	OFF
Dispense Auto Print					Opened	ON	OFF
Dispense Manual Print					Opened	OFF	ON
Program Download	OFF	OFF	ON	OFF	Closed	OFF	OFF
Set Head Check	OFF	ON	OFF	ON	Opened	ON	OFF
Cancel Head Check					Opened	OFF	ON

IRDA QUICK REFERENCE TABLE							
DESCRIPTION	DIP SWITCHES				COVER	PRINT KEY	FEED KEY
Normal Mode	ON	OFF	OFF	OFF	Closed	OFF	OFF
User Test Print					Closed	OFF	ON
Hex Dump	ON	OFF	ON	ON	Closed	OFF	OFF
Set Head Check	ON	OFF	OFF	ON	Opened	ON	OFF
Cancel Head Check					Opened	OFF	ON

USB QUICK REFERENCE TABLE							
DESCRIPTION	DIP SWITCHES				COVER	PRINT KEY	FEED KEY
Normal Mode	ON	ON	OFF	OFF	Closed	OFF	OFF
User Test Print					Closed	OFF	ON
Hex Dump	ON	ON	ON	ON	Closed	OFF	OFF
Set Head Check	OFF	ON	OFF	ON	Opened	ON	OFF
Cancel Head Check					Opened	OFF	ON

BLUETOOTH/ WIRELESS LAN QUICK REFERENCE TABLE							
DESCRIPTION	DIP SWITCHES				COVER	PRINT KEY	FEED KEY
Normal Mode	OFF	ON	OFF	OFF	Closed	OFF	OFF
User Test Print					Closed	OFF	ON
Maintenance Mode					Opened	OFF	ON
Hex Dump	OFF	ON	ON	ON	Closed	OFF	OFF
Enable CRC (Digit Check)	OFF	ON	ON	ON	Opened	ON	OFF
Disable CRC (Digit Check)					Opened	OFF	ON
Set Head Check	OFF	ON	OFF	ON	Opened	ON	OFF
Cancel Head Check					Opened	OFF	ON

CONFIGURATION MODES

This chapter provides an overview of the various configuration modes of the operation menu. All of the following configuration activities are performed via the use of the operator panel located on the printer front. However, many settings may also be controlled via software commands. In the case of conflict between the software and control panel settings, the printer will always use the last entered valid setting.

NORMAL MODE

When in the Normal Mode the printer is online and ready for print activity. If print activity, downloading, or other interaction does not occur, the printer will go into the Sleep Mode and from there, into the Offline Mode.

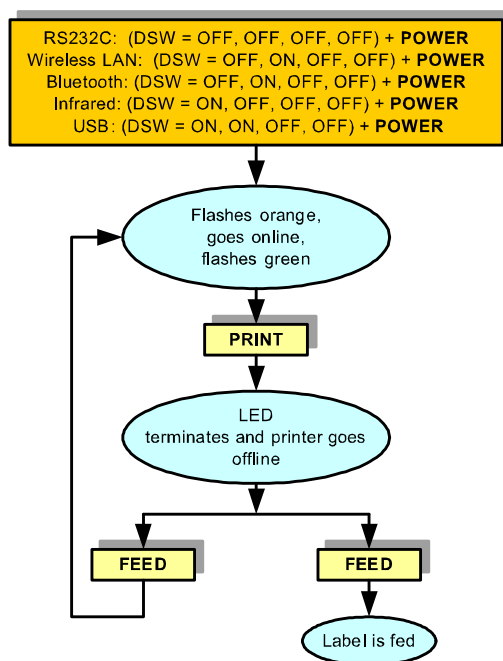


Figure 4-12, Normal Mode

LABEL SENSOR SELECTION

This function allows for the determination of the sensor to be used to control label positioning relative to the media type that will be used. The two options are; I-mark and gap. This selection can only be made through host interface using a RS232C cable.

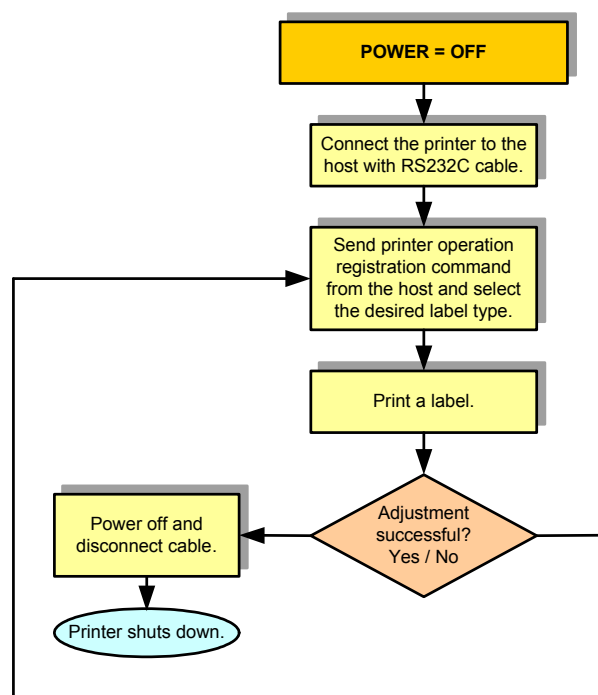


Figure 4-13, Label Sensor Selection

DISPENSE MODE

This feature allows for the determination of the method of dispense.

AUTO Prints a single label after receiving data, waits for the label to be retrieved, then automatically prints the next label.

MANUAL Prints a single label after receiving data and then goes offline. Prints a single label each time the PRINT key is pressed until the specified number of labels has been printed. A new job will have to be downloaded to print more.

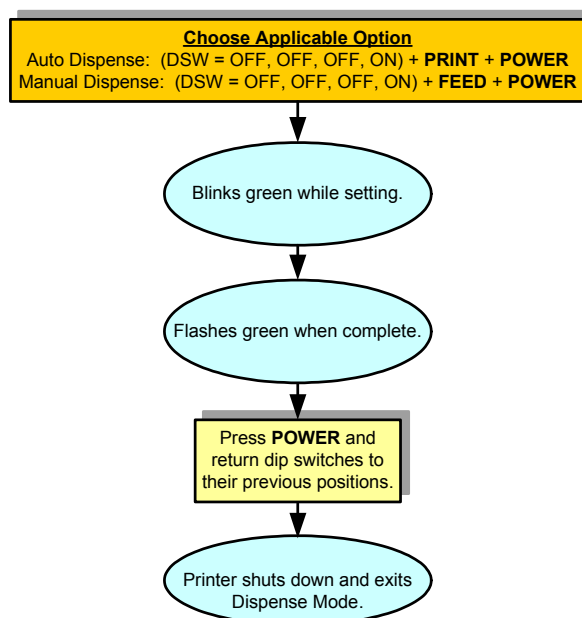


Figure 4-14, Dispense Mode

DOWNLOAD MODE

This download feature allows the operator to download print jobs to the printer. The data is received through an RS232C interface in binary form using XMODEM protocol for file transfer.

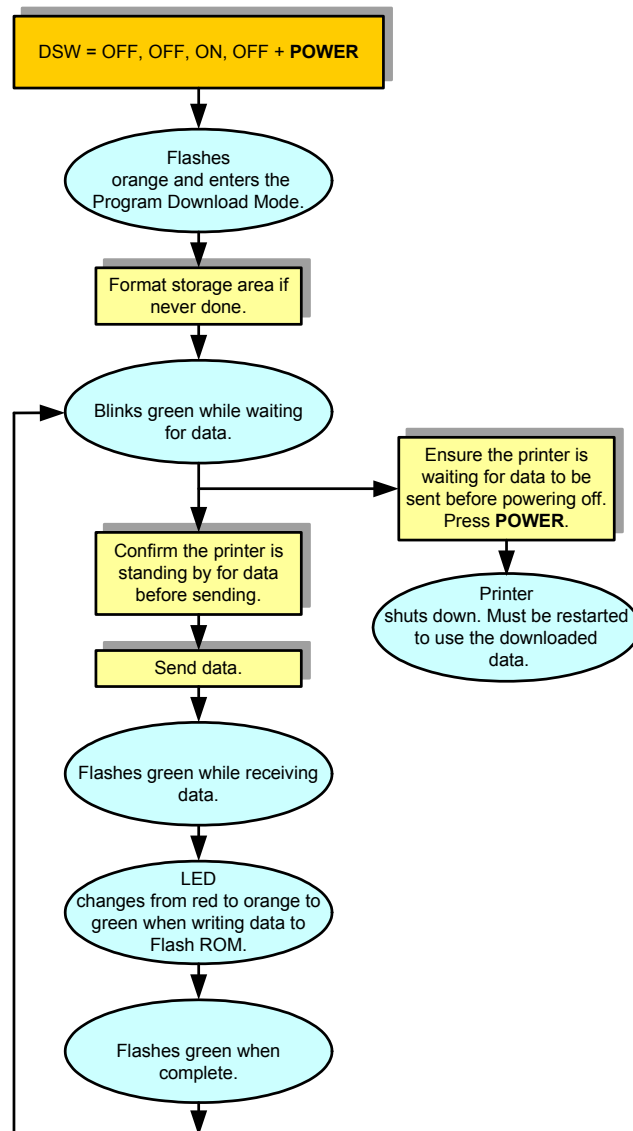


Figure 4-15, Program Download Mode

In XMODEM protocol, data is transferred block by block. Each starts with SOH(01h) and consists of 132 bytes such as block number (BLK) of 1 byte, complement of block number (_BLK), 128 bytes main data, and check sum (SUM) of 1 byte.

The block number starts from 1, and when counting to 255, the number goes back to 0 again. If the block number is [01h], complement of block number becomes [FEh]. In the main data, the section of data by 128 bytes is stored. SUM is the check sum computed from 128 bytes of main data.

NOTE: The above method is the XMODEM (check sum) option. Select this option in the XMODEM settings on the host side.

When downloading data, the format is such that the first 16 bytes are used as header information and the rest is considered as data. The header information is divided thus: code (4 bytes), start address (4 bytes), file size (4 bytes), and reserved area (4 bytes). The remaining optional data is to be stored in Flash ROM.

The basic sequence of XMODEM is to transfer data blocks by individually checking response blocks. NAK (15h) transmission by the receiving end initiates the sequence, and the sending end sends the first data block after receiving NAK. The receiving end receives and checks this data block, and then returns ACK (06h) in case of no error or NAK (15h) in case of an error. The sending end sends the next block when receiving ACK, and resends the same block when receiving NAK. This process repeats to the first block. EOT (04h) is sent from the sending end to receiving end at the end of all data transmission. After receiving EOT (04h), the receiving end returns ACK to terminate the sequence.

FONT DOWNLOAD MODE

A flash ROM is used to internally store and delete font data and custom designed data. The storage capacity for custom designed characters is a maximum of 95 for each of type of 16 x 16, 22 x 22, 24 x 24 dots.

There are four transmission protocols for font download: (1) Download Font Storage, (2) Download Font Selection, (3) Download Font Information Acquisition, (4) Storage Custom-Designed Character. The return status from the printer is set between STX (02h) and ETX (03h), and transferred in 3 bytes.

Wiring on the computer side may require a CTS (pin 5) and RTS (pin 4) cable connection. Confirm the host settings before downloading.

Figure 4-16 provides the specific sequence of events required by the operator, the printer, and the printers software for font download mode to be activated.

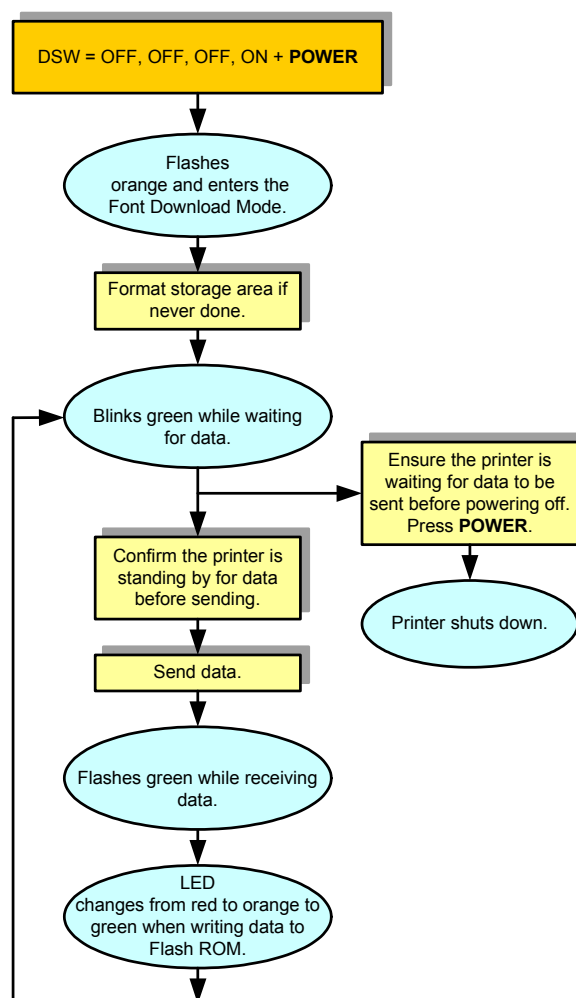


Figure 4-16, Font Download Mode

DOWNLOAD FONT REGISTRATION			
STATUS DESCRIPTION	ACSII	HEX	TRANSFER
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Storage Area NG	N	4E	Printer to Host
Store Font	0	30	Host to Printer
Do Not Store Font	1	31	Host to Printer
Ready For Storage Status	O	4F	Printer to Host
Font Storage Completed Normally	E	45	Printer to Host
Font Storage Cancelled	S	53	Printer to Host
Font Storage Completed Abnormally	Z	5A	Printer to Host

DOWNLOAD FONT DELETION			
STATUS DESCRIPTION	ACSII	HEX	TRANSFER
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Delete Font	0	30	Host to Printer
Do Not Delete Font	1	31	Host to Printer
Font Deletion Completed Normally	E	45	Printer to Host
Font Deletion Cancelled	S	53	Printer to Host
Font Storage Completed Abnormally	Z	5A	Printer to Host

DOWNLOAD FONT INFORMATION ACQUISITION			
STATUS DESCRIPTION	ACSII	HEX	TRANSFER
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Font Information Transferred OK	0	30	Host to Printer
Number of Transferred Data	000000-999999	6 bytes w/ 30-39	Printer to Host
Font Information	Font Info Data + Font Data Info		Printer to Host

STORAGE OF CUSTOM DESIGNED CHARACTER			
STATUS DESCRIPTION	ACSII	HEX	TRANSFER
Storage Ready Status	O	4F	Printer to Host
Storage Completed Normally	E	45	Printer to Host
Storage Completed Abnormally	Z	5A	Host to Printer

ONLINE COMMAND MODE

This function allows the selection of receiving command by using either standard SATO Barcode Printer Language (SBPL) or first generation MB400 compatible commands. The MB400 compatible command option should only be chosen if first generation MB400's will be used along with the newer generation. This will provide a common command language that will communicate to both.

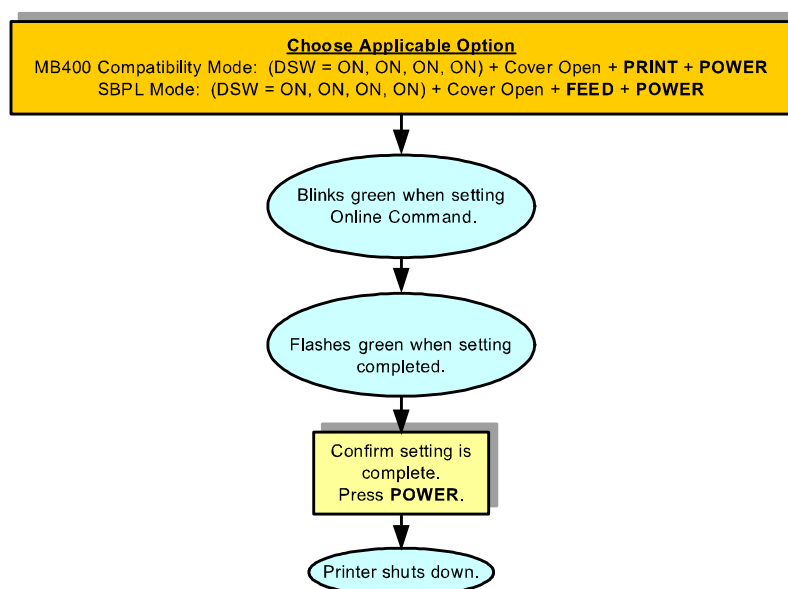


Figure 4-17, Online Command Mode

CRC (CYCLIC REDUNDANCY CHECK) MODE

Allows the operator to enable or disable the Cyclic Redundancy Check (CRC) for each received print data when using wireless LAN or Bluetooth interface.

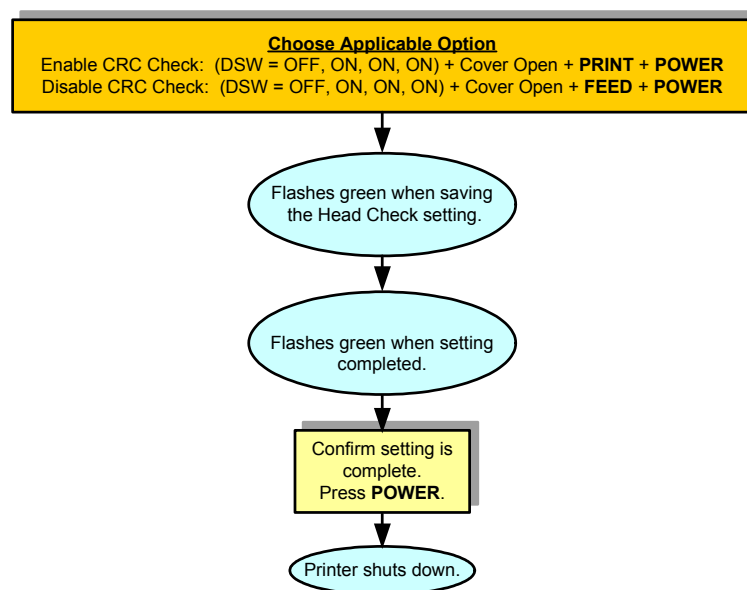


Figure 4-18, CRC Check Mode

SLEEP & AUTO-OFF MODE

This mode is a non-interactive mode that is provided to explain the timed sequence of events that relate to the printer going into sleep mode and then further into offline mode.

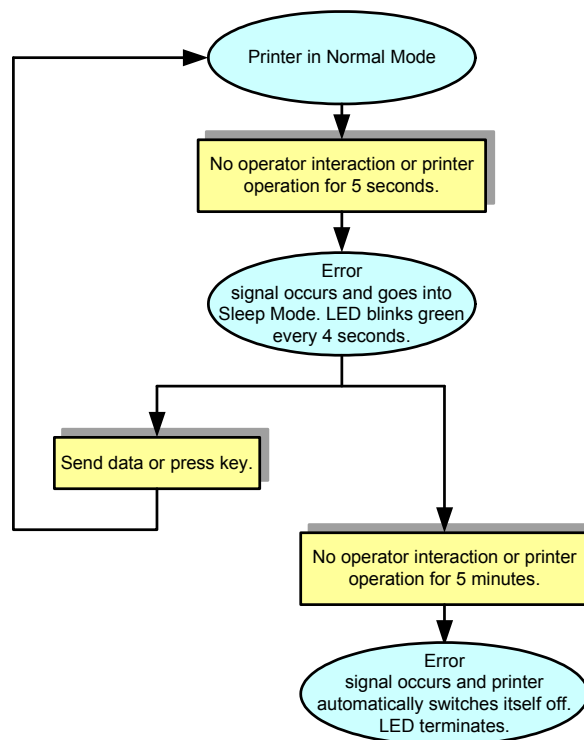


Figure 4-19, Sleep & Auto-Off Mode

PRINTING PROCEDURE

After the proper setup and basic configuration procedures, you are ready to print with the MB400i/410i.

1. Make sure the host computer is ready to transmit data, and ensure that the STATUS LED is lit or blinking. (Press the PRINT button to take the printer ONLINE).

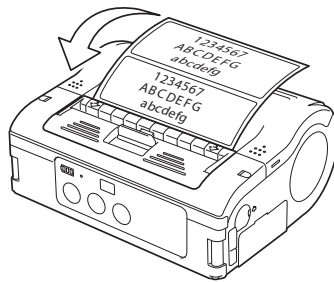


Figure 4-20, Pulling the Printed Label Toward You

2. Start the print job from the computer. When printing is finished, pinch either the left or right corner of the printed roll of label(s) and tear it off in the direction of the arrow in the diagram.

NOTES:

- The number of sheets you can print is determined by the printer's mode (continuous or dispense mode).
- When printing linerless labels and you have torn the labels at a wrong place, stop the printing and follow the instructions on the next page to correct the print job.

ADJUSTING PRINTING FOR LINERLESS LABELS

When printing on a continuous label roll (linerless label without perforation), if you tear off a label at the wrong place, proceed as follows.

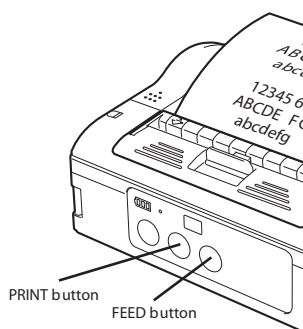


Figure 4-21, Location of PRINT Button and FEED Button

1. Interrupt printing on the computer, or press the PRINT key in the ONLINE state to take the printer OFFLINE. (STATUS LED goes off).

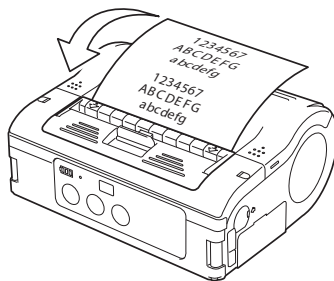


Figure 4-22, Pulling the Printed Label Toward You

2. Press the FEED button to feed a label (assuming that I-mark sensor is being used). When the feeding stops, tear off the label correctly by pulling the label in the direction of the arrow shown in Figure 4-22. The label is now aligned properly for printing to resume.
3. Press the PRINT button to return to the online state (STATUS LED lights green). You can now resume the print job.

CHOOSING THE LABEL DISPENSING MODE

You can choose to dispense labels in Continuous Mode and Dispense Mode. In either mode, test printing and online printing are available.

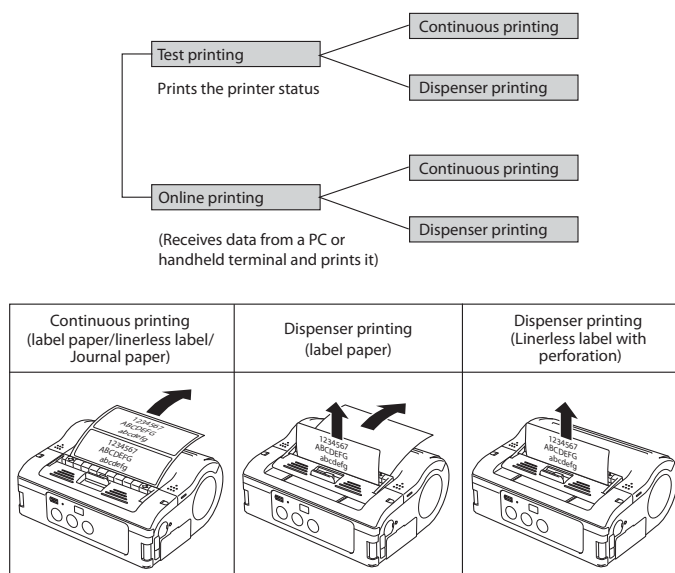


Figure 4-23, Available Modes and Options

You can select **Dispense mode** for linerless labels by using the MB400i/MB410i utility.

CONFIGURING DISPENSE MODE

Table 4-1, Dispense Mode Settings

TYPE	OPERATION
Auto Print	Prints one label after receiving data and waits for peeling. After peeling a label, automatically prints next label.
Manual Print (this is the default setting)	Prints one label after receiving data and enters offline state. Pressing the PRINT key allows next label to be printed. After printing the specified number of labels, printing terminates. No printing occurs even when the PRINT key is pressed.

Dispense Mode can be set to Auto Print or Manual Print, as described in Table 4-1, above.

To switch between Auto or Manual Print for the Dispense Mode, set the DIP switches as outlined below, and then hold down the PRINT or FEED button when turning the printer ON. The new settings take effect when the printer is next turned ON.

<p>Setting Auto Print dispense mode:</p> <p>DSW1-4=OFF,OFF,OFF,ON + Cover open + PRINT button + power ON</p> <p>Setting Manual Print dispense mode:</p> <p>DSW1-4=OFF,OFF,OFF,ON + Cover open + FEED button + power ON</p>
--

When setting the dispense mode, the STATUS LED blinks green, and turns into a steady green signal upon completion of setting. Turn off the printer **ONLY** when the STATUS LED is a steady green light.

OTHER PRINTER MODES

Available printer modes include **Normal**, **Test Print**, **Head Check Setting** and **Online Command Setting** mode.

In the Normal mode, a user can initiate printing or feed paper.

Test print mode allows the user to generate a print in order to check or correct any print quality concerns, and to check the remaining battery life.

The Head check setting mode enables the user to set up the printer to determine whether the printing area is correct, and to determine whether the printing area is limited to only barcode printing.

In the Online command setting mode, the user can select the command or programming language the printer should use.

NORMAL MODE

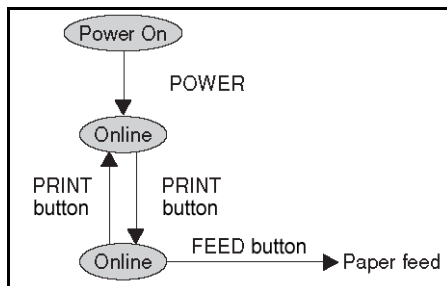


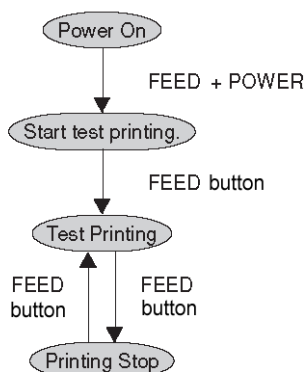
Table 4-2, STATUS LED behavior in Normal Mode

Operational State	STATUS LED	LED Action
START OF PRINTING	Orange	Steady
ONLINE	Green	Steady
OFFLINE	OFF	NA
STANDBY (after 5 seconds of inactivity)	Green	Blinks every 4 seconds

Note: The Battery indicator (all models except WLAN model) remains lit even when the printer is OFFLINE. During the Standby state, the printer resumes normal operational status upon sensing any incoming data or pressing of the buttons.

TEST PRINT MODE

1. Enter Test Print mode as shown, by using the FEED and POWER buttons.



2. In order to start and stop Test Printing, press the FEED button.

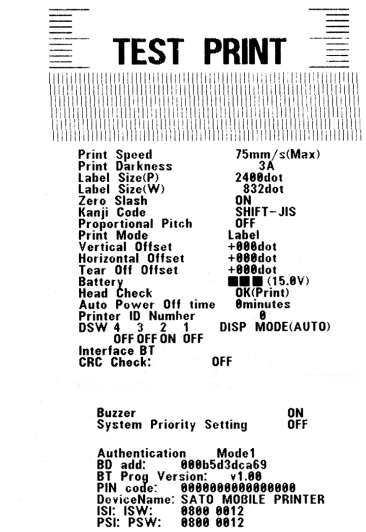


Figure 4-24, Sample Test Print

Table 4-3, STATUS LED behavior in Test Print Mode

Operational State	STATUS LED	LED Action
ENTERING TEST PRINT MODE	Orange	Steady
START OF TEST PRINT	Green	Blinks
DURING TEST PRINT	Green	Steady
END OF TEST PRINT	OFF	NA

HEAD CHECK SETTING MODE

Head checking can be applied to one of two areas: the **normal print area** and the **barcode print area**. In the normal print area, it checks all printed data. In the barcode print area, it only checks the area where the barcode is. To specify the area subjected to a head check, follow the settings in the table below:

Table 4-4, Setting Head Check Area (cover must be left open)

H.Check setting	DSW-1	DSW-2	DSW-3	DSW-4	Other keys
Normal Print Area	OFF	ON	OFF	ON	hold down PRINT button
Disable H. Check	OFF	ON	OFF	ON	hold down FEED button
Barcode Print Area	ON	OFF	OFF	ON	hold down PRINT button
Disable H. Check	ON	OFF	OFF	ON	hold down FEED button

You can check the current setting with a test printout as described in “Performing a Test Print” in this section of this manual.

When setting the Head Check options, the STATUS LED blinks green, and turns into a steady green signal upon completion of setting. Turn off the printer **ONLY** when the STATUS LED is a steady green light.

ONLINE COMMAND COMPATIBILITY MODE

The printer can be set for compatibility with SBPL commands or with the older MB400-compatible commands.

Table 4-5, Setting Online Command compatibility

(COVER MUST BE LEFT OPEN)

Compati bility	DSW-1	DSW-2	DSW-3	DSW-4	Other keys
MB400- compati ble online comman ds	ON	ON	ON	ON	hold down PRINT button
SBPL online comman ds	ON	ON	ON	ON	hold down FEED button

You can check the current setting with a test printout as described in “Performing a Test Print” in this section of this document.

When setting the online command compatibility options, the STATUS LED blinks green, and turns into a steady green signal upon completion of setting. Turn off the printer **ONLY** when the STATUS LED is a steady green light.

OFFSET CONFIGURATION VIA PROGRAMMING

The following offset adjustments for the MB400i/410i printer are usually unnecessary. Almost all adjustments are electrical in nature due to the printer's advanced self aligning and balancing design features. However, if you need to perform the adjustments, they can be sent as commands to the printer. Consult your SATO representative for information on programming the MB400i/410i printer, or refer to the Programming Reference guide found on the CD-ROM.

Table 4-6, Position Adjustments

POSITION ADJUSTMENTS		
Adjustment	Method	Description
Printer Setting Commands	Use the <PG> programming command.	Saves the values to the Flash ROM.
Base Point Offset		
Pitch Offset		
Dispense Offset		
Tear-Off Offset		
Base Point Offset	Use the <A3> programming command.	Takes effect instantly; the value is cleared once the power is turned off.
Pitch Offset	Use the <PO3> programming command.	Takes effect instantly; the value is cleared once the power is turned off.
Dispense Offset	Use the <PO1> programming command.	Takes effect instantly; the value is cleared once the power is turned off.
Tear-Off Offset	Use the <PO2> programming command.	Takes effect instantly; the value is cleared once the power is turned off.

5

OPERATING MODES

- **Operating Modes**

OPERATING MODES

ENABLING AND DISABLING SPECIAL FUNCTIONS

Through a combination of DIP switch settings and turning the printer ON with certain buttons held down, you can enable or disable special functions/features.

To locate and change DIP switch settings on the printer, see Setting the DIP Switches in the Operation and Configuration section of this manual.

Table 5-1, Enabling and Disabling Special Functions

DIP Switch				Cover	Key		Startup Mode	
1	2	3	4		Print	Feed	Interface	Content
OFF	OFF	OFF	OFF	CLOSE	OFF	OFF	RS-232C	Normal printing mode
				CLOSE	OFF	ON	-	User test printing mode
OFF	OFF	ON	ON	CLOSE	OFF	OFF	RS-232C	HEX dump mode
				OPEN	ON	OFF	-	Buzzer sound disabled
				OPEN	OFF	ON	-	Buzzer sound enabled
OFF	OFF	OFF	ON	OPEN	ON	OFF	-	Set Automatic peeling printing
				OPEN	OFF	ON	-	Set Manual peeling printing
OFF	ON	OFF	OFF	CLOSE	OFF	OFF	Bluetooth interface Wireless LAN inter- face	Normal printing mode
				CLOSE	OFF	ON	-	User test printing mode
OFF	ON	OFF	ON	OPEN	ON	OFF	-	Head check (printing area) setting
				OPEN	OFF	ON	-	Head check disabled
OFF	ON	ON	ON	CLOSE	OFF	OFF	Bluetooth interface Wireless LAN inter- face	HEX dump mode
				OPEN	ON	OFF	-	CRC check enabled
				OPEN	OFF	ON	-	CRC check enabled

ON	OFF	OFF	OFF	CLOSE	OFF	OFF	Infrared interface	Normal startup mode
				CLOSE	OFF	ON	-	Test printing mode
ON	OFF	ON	ON	CLOSE	OFF	OFF	Infrared interface	HEX dump mode
ON	OFF	OFF	ON	OPEN	ON	OFF	-	Head check (Barcode printing area) setting
				OPEN	OFF	ON	-	Head check disabled
ON	ON	OFF	OFF	CLOSE	OFF	OFF	USB interface	Normal operation
				CLOSE	OFF	ON	-	Test printing mode
ON	ON	ON	ON	CLOSE	OFF	OFF	USB interface	HEX dump mode
				OPEN	ON	OFF	-	Set compatibility with MB400 Online Commands
				OPEN	OFF	ON	-	Set compatibility with SBPL Online Commands
ON	ON	OFF	ON	OPEN	ON	OFF	-	Non-standard Control codes
				OPEN	OFF	ON	-	Standard Control codes

NOTES:

A small label may produce a large amount of data when printing a Hex Dump.

When the onboard buzzer is enabled, it will sound when the printer is turned ON during DIP switch setting. Release the FEED button to stop the buzzer.

To end any setting for Standard/Non-standard Control Code or Peeling Print or Online Command compatibility, confirm that the STATUS LED is lit green. Then turn the printer OFF, and reset the DIP switches as necessary.

WARNING

Never connect or disconnect interface cables (or use switch box) with power applied to either the host or the printer. This may cause damage to the interface circuitry in the printer/host and is not covered by warranty.

NOTE

Some hosts monitor the Request-to-Send (RTS) signal (pin 4 of 25) to determine if the printer is ready to receive data. Since the printer does not generate this signal, the RTS line must be held true (high) in order to allow communication. Perform this by connecting the RTS pin to the Clear-To-Send (CTS) signal (pin 5 of 25).

6

CLEANING AND MAINTENANCE

- **Cleaning and Maintenance**

CLEANING AND MAINTENANCE

By cleaning and maintaining the printer regularly, you will prolong its durability and reliability, and also reduce the inconvenience of unnecessary malfunctions. Perform the following procedures regularly after turning the printer OFF and removing the battery pack.

CLEANING THE PRINT HEAD

The printer mode, Head Check Setting, enables the user to set up the printer to determine whether the printing area is correct, and to determine whether the printing area is correct, and to determine whether the printing area is limited to only barcode printing.

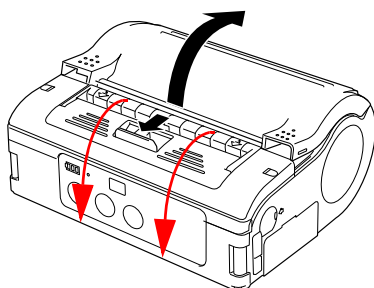


Figure 6-1, Opening the Cover

1. Slide the Cover Open
2. Close lever downwards to release the cover.

If the lever cannot be pushed downwards, first slide the dispenser unit downwards (see the red arrows), so that it returns to the continuous mode position.

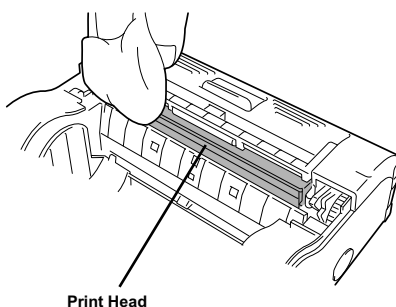


Figure 6-2, Cleaning the Print Head

3. Remove power and battery, then wipe off any dirt on the print head using isopropyl alcohol. Never use thinner, benzene, or kerosene.

CLEANING THE PLATEN AND DISPENSER ROLLER

Users can perform test prints to evaluate the print quality and also diagnose problems.

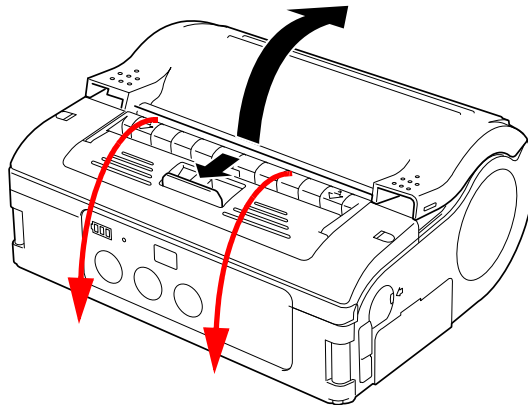


Figure 6-3, Opening the Cover

1. Slide the Cover Open.
 2. Close lever downwards to release the cover.
- If the lever cannot be pushed downwards, first slide the dispenser unit downwards (see the red arrows), so that it returns to the continuous mode position.

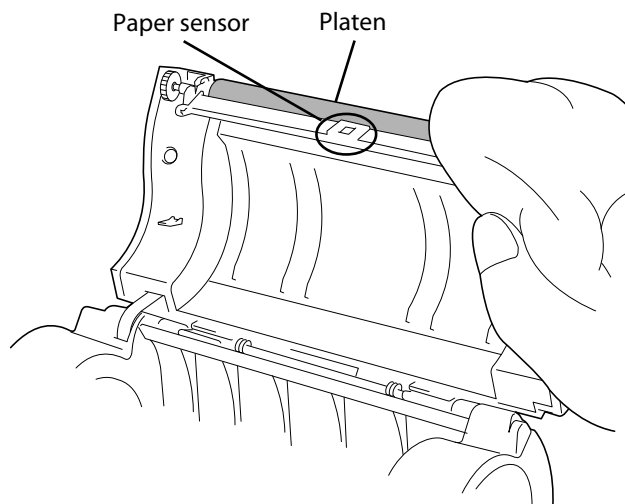


Figure 6-4, Cleaning Under the Cover

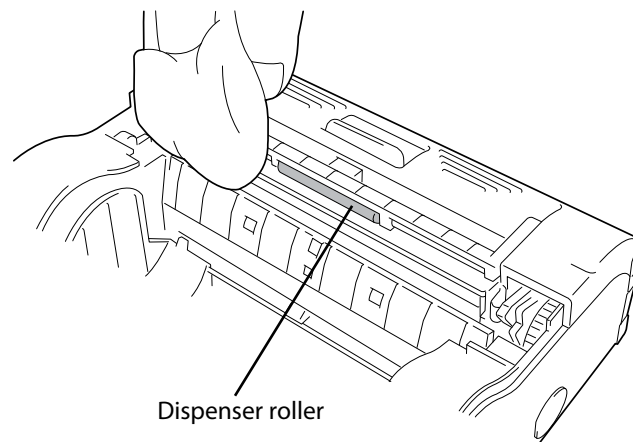


Figure 6-5, Cleaning the Dispenser Roller

3. Wipe off any dirt using isopropyl alcohol.
Never use thinner, benzene, or kerosene.

7

TROUBLESHOOTING

- Troubleshooting

TROUBLESHOOTING

When you experience any problems operating the printer, refer to the following tables.

WHAT TO DO IN CASE OF...

Table 7-1, Problem and Remedy Table

PRINT FAULT	CAUSE	REMEDY
Smudged printing	1. Print head is dirty 2. Roller is dirty	1. Clean the print head 2. Clean the platen and dispense roller (See Section 6: Cleaning and Maintenance)
Vertical streaking in printouts	1. Print head is dirty 2. Print head is faulty	1. Clean the print head 2. Run head check 3. Replace the print head
Slanted text characters	1. Paper guide is positioned incorrectly 2. Roller is dirty	1. Retry with different label paper. Use only SATO-certified media for best print quality and minimal problems 2. Clean the platen and dispense roller (See Section 6: Cleaning and Maintenance)
No printing	1. RS-232C cable connection is faulty or settings are wrong 2. IrDA Interface is faulty or settings are wrong 3. Bluetooth/WLAN interface is faulty or settings are wrong 4. DIP Switch setting is incorrect 5. Print head is faulty	1. Check the connection of the RS-232C cable connector (See Printing Via the RS-232C Interface in Section 4, Operation and Configuration) 2. The printer and IrDA host must be within 6 or 8 inches (15 or 20 cm) of one another. The host must be located at the center of the IrDA filter (com area) of the printer (See Printing Via the IrDA Interface in Section 4: Operation and Configuration) 3. Check the communication protocol settings 4. Double-check DIP Switch settings (See Enabling and Disabling Special Settings in Section 5, Operating Modes). 5. Replace the print head

ERROR INDICATORS**Table 7-2, Error Indicators**

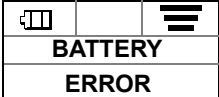
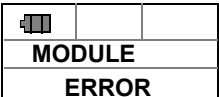
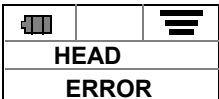
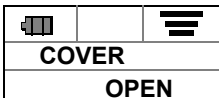
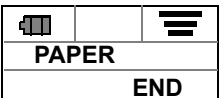
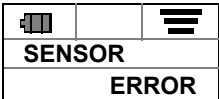
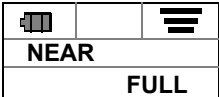
STATUS LED	MODE	DESCRIPTION	CAUSE	REMEDY
Light (red)	All modes	Low battery	Battery charge level is low	Recharge the battery
Blink (red) every 2s	Online	Error in BlueTooth or WLAN card	Interface module error (Bluetooth, wireless LAN)	Contact a SATO service center
Light (red)	After Power On	1. Program illegal error 2. Flash Rom-error	Flash ROM read/write error has occurred	1. Replace Flash ROM* 2. Retry downloading program*
Blink (green-red) every 2s	Online	Head error	Head wiring is disconnected	Replace the head*
Blink (red) every 0.5s	Online	Cover open Paper End Sensor error	1. Cover is not locked 2. Cover open/close sensor malfunctioning 3. Paper is not present 4. Wrong sensor level 5. Wrong sensor type 6. Paper skew	1. Lock the cover 2. Adjust sensor level* 3. Load paper 4. Adjust sensor level* 5. Set correct sensor type 6. Reload paper
Blink (green) at 0.5s intervals	Online (Printing or receiving data)	Buffer near full	Insufficient space in Receive Buffer area	Stop sending data from the host, and wait until the buffer becomes empty. Resume sending data.
Blink (green) every 4s	All modes	Sleep mode	Not in error. Low power consumption mode is active.	Clear the mode by receiving data, pressing a key, opening or closing the cover.

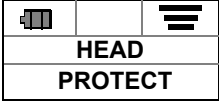
STATUS LED	MODE	DESCRIPTION	CAUSE	REMEDY
Blink (green->off->red->off) every 1s	All modes	Head overheat protection feature	When print head is hotter than 158 degrees F (70 degrees C), the print head overheat protection feature is activated. Not in error.	Cleared when the head temperature drops to 122 degrees F (50 degrees C).

* Contact your nearest dealer or SATO representative for support

WARNING: Never connect or disconnect interface cables (or use a switch box) with power applied to either the printer or the host. This may cause damage to the interface circuitry and the damage is not covered by warranty.

LCD ERROR MESSAGES (WLAN MODEL ONLY)**Table 7-3, LCD Error Messages (WLAN model only)**

STATUS (LED)	DESCRIPTION	REMEDY
Illegal Program Error / Flash ROM Error	No display on the LCD	Check Status LED for detail
Low battery		Battery Error (Font 14x24 Dot) - Shows low battery and battery icon blinks (*2)
Module Error Wireless LAN Bluetooth		Module Error (Font 14x24 Dot) - Shows module error was detected in Wireless LAN or Bluetooth interface (*1)(*2)
Head Error		Head Error (Font 14x24 Dot) - Malfunction in the Print head. (*2)
Cover Open		Cover Open error - Shows top cover is open. - Close the cover to return to previous display.
Paper End		Paper End error (Font 14x24 Dot) - Label paper supply has run out - Load a new roll of label paper (*2)
Sensor Error		Sensor error (Font 14x24 Dot) - Sensor malfunction or not set properly. (*2)
Buffer Near Full		Near Full error (Font 14x24 Dot) - The buffer memory is nearly full. - Cancel the status to return to previous display.

STATUS (LED)	DESCRIPTION	REMEDY
Head Protect	 <div> <div>HEAD</div> <div>PROTECT</div> </div>	<p>Head Protect error (due to overheat) (Font 14x24 Dot)</p> <ul style="list-style-type: none"> - The print head has overheated - Returns to normal status if print head cools down

(*1) Electric field strength for wireless LAN is not displayed.

(*2) Electric field strength for wireless LAN is displayed only when wireless LAN is set as interface.

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